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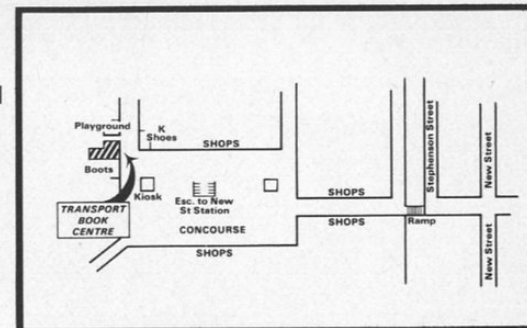
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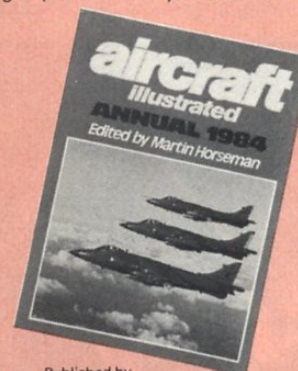
Advertising: Suzanne Hirst
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Cover: RNZAF A-4K Skyhawks in 'finger four' formation. The aircraft belong to No 57 Squadron (note the unit's badge on the air intake) and from front to rear are: NZ6208, NZ6203, NZ6201 and NZ6204. The first article of a four-part survey by Greg Meggs on the RNZAF begins on page 550 and looks at the historical background to the service and also the training of its pilots and navigators. Photo: Greg Meggs

Frontispiece: Taking advantage of its nap-of-the-earth capabilities, the prototype Hughes YAH-64A Apache skims along the Colorado River valley, following the natural contours of the land. The first production AH-64A of 515 planned for the US Army was rolled-out at Hughes Helicopters' facility at Mesa, Az on 30 September and is scheduled to make its maiden flight this month. The two-seat AH-64A attack helicopter is powered by two General Electric T700-GE-701 engines and can be equipped with up to 16 Hellfire laser-guided missiles, 76 2.75in air-to-ground rockets, or a combination of both, in addition to 1,200 rounds of 30mm ammunition for self defence and suppressive fire. Photo: Hughes Helicopters

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Royal Navy Sea Harriers adorn the cover of the 1984 edition of the **Aircraft Illustrated Annual** that is on sale now. The book's content caters for all aviation interests and articles in this volume feature such varied topics as: RAF Germany, the Imperial War Museum at Duxford, The McDonnell Douglas DC-9 and 'Build it yourself'. The Annual is available at an unchanged price on last year's edition — **£3.95**



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Paul Humphreys	533	airscan
	534	airnews
	538	airmail
James Goulding	539	airkits
Marshal of the RAF		
Lord Cameron GCB, DSO, DFC	540	Behind enemy lines
Philip J. Birtles	546	Swissairbus update
Greg Meggs	550	RNZAF: the flying Kiwis (part 1)
Photo feature	557	Formating Eagles
R. A. Nicholls	558	A Tabloid for Hendon
Brian Walters	561	CN-235 roll-out
Philip J. Birtles	562	Zürich scenes
Alan J. Wright	564	air register
Peter R. March	565	airmarks
Peter R. March	566	airvideo
	567	airbooks
Peter R. March	568	airview
Photo report	572	Commemorating DC-2 Uiver
	574	Index to Volume 16

airscan

Paul Humphreys

A FEW weeks ago, I recall, there was a newspaper report to the effect that someone had called into question the, then, forthcoming attendance of a Soviet delegation to — of all things — a symposium, seminar or conference on the subject of Britain's defences. The answer which winged its way along the official corridors of power and out into the real world was that as these delegates were not very important it was considered to be in order for them to attend.

Now history has this annoying and almost unbelievable habit of repeating itself and this strange drama had been acted out some 47 years ago.

During the early Autumn of 1937 RAF Fighter Command's most modern fighter was still the four-gun Gladiator biplane with which eight squadrons had been equipped. It was in October that the British Government decided to play gracious host to three senior *Luftwaffe* staff officers; Generalfeldmarschal Erhard Milch, Generaloberst Hans-Jürgen Stumpff and the famed Generaloberst Ernst Udet. Astonishingly, they were invited to visit RAF Hornchurch, a key airfield in the defensive chain of airfields around London. There they were allowed to inspect the Gladiators of Nos 54 and 65 Squadrons and to tour the station facilities.

It will never be known whether any mention was made of the new generation of eight-gun monoplane fighters — the Hurricane and Spitfire — which were to enter squadron service only eight or nine weeks after the Germans had said their goodbyes. By the opening weeks of the war just 12 months later some 30 squadrons had been equipped with these two outstanding types of fighter.

So, was this a brilliant piece of deception on the part of the Air Ministry, a deliberate attempt to present Fighter Command as a comparatively small force with out-of-date biplanes as its most potent weapon, or was it an almost unbelievable lapse of security? Sadly, 47 years later, one could be pardoned for not asking the same question about the visit of the Soviet delegates because the true answer will, again, never be known.

Trans-Atlantic marketplace (Scene 3)

For the third time the above cross-head appears in the columns of 'airscan'. Scene 1 in September 1978 was all about the golden future for all kinds of UK and European defence equipment in the US market, the Anglo-US Memorandum of Understanding and the two-way street. When the curtain went up on Scene 2 in 'airscan' of March this year it was all gloom and doom with US Congress blocking a US Navy deal to buy Martin Baker 'bang' seats for the F/A-18 Hornet.

This month's Scene 3 is all sweetness and light (well, Christmas is on finals) with both Houses of the US Congress looking set to accept a change in the 1983 Pentagon Appropriation Bill which will thus allow the US Navy to have its Hornets fitted with Martin Baker seats rather than the home-grown Stencel products. If Congress does, indeed, permit this off-shore purchase of a piece of British equipment preferred by its Naval aviators, then it will have dealt the NIH (not invented here) syndrome and US protectionism a hefty blow.

Oh Mr Aiporter

What a delight it was for the Humphrey's letter box to open recently and to receive into its maw a notice about AES '84 which will take place during May next year in Birmingham. AES '84? Birmingham? Alabama or West Midlands? The answers to all these questions were part of the reason for the delight.

Those cryptic capital letters refer to an international exhibition of airport equipment and services which will be held at the National Exhibition Centre in Britain's 'Brum'.

The date has been chosen so that this show coincides with the opening of Birmingham International Airport's new terminal with its astonishing MAGLEV. And what is MAGLEV? This is the 1,900ft long people moving system which will link British Rail's Birmingham International Station at the NEC with the new terminal building. Two three-carriage trains using magnetic levitation to lift and support them clear of the dual tracks, will shuttle between the two points averaging about 15mph. MAGLEV is British and Birmingham Airport is proud of it. This makes good news compared with that emanating from London-Heathrow where refuellers based on Volvo trucks are coming into service to replace refuellers based on British chassis. It is reported that no British vehicle manufacturer could now supply the kind of equipment required.

But back — or onward — to AES '84. It was nearly two years ago that I was banging on a bit about exhibitions of this kind which are slowly infilling the gaps in the spectrum of aviation-orientated shows. There's been the International Airport Construction and Equipment Exhibition; we've had Airmec covering aircraft servicing and maintenance equipment and services; now comes airport equipment and services.

AES '84 is to be sponsored by BAAEMS. That's the British Association of Airport Equipment Manufacturers and Services — as if you didn't know — which will have as collaborator the publication *Airport Support*. Some 20,000 airport executives from around the world will be invited to attend the show and to see what British and overseas manufacturers have to offer to the airport industry. One wonders if there will be any refuellers based on British chassis.

Incidentally, I'm still eager to see some enterprising promoter stepping up to mound FLYTREX. That's a Flying Training Exhibition.



Above: Two RAF Buccaneers from No 208 Squadron and one from No 12 Squadron at the dispersal area on Akrotiri Airfield, Cyprus during the recent Lebanon crisis. Photo: MoD

BCal orders A320

In the first independent order for the Airbus Industrie A320, British Caledonian is to purchase seven of the airliners, worth \$240million (£150million), excluding engines and spares, and has taken options on a further three. Three of the advanced short/medium range aircraft — currently on the drawing board — are scheduled to be delivered in spring 1988 and a further four in 1989.

At the same time, BCal announced a major programme of modernisation for its fleet of BAC One-Eleven srs 500 aircraft. This will involve 'blind landing' capability; 'hush-kitted' engines; and a total remodelling of the interiors, including new seats and galley installations.

Announcing the A320 order, BCal chairman, Sir Adam Thomson, said: 'In our search for a short/medium haul replacement, an exhaustive and detailed evaluation process was undertaken. It was a very close race to the finish between the A320, the Boeing 737-300 and the MD-90 — all extremely fine aircraft.'

'In the final analysis, the A320 won as it provides the best possible economic/operational formula for BCal through the 1990s and into the 21st century, with the most advanced technology yet proposed. It presented the best option for the long term.'

It is planned that the A320's construction partnership will be similar to the A310, with the wings being made by British Aerospace. Initial BCal A320s will be powered by CFM International, 23,000lb-thrust CFM 56-4 engines, although the airline has not ruled out the possibility of equipping future orders with IAE2500 engines from the Rolls-Royce international consortium, International Aero Engines.

The A320 is planned to enter service on BCal's scheduled services initially linking London-Gatwick with Paris, Amsterdam, Geneva, Frankfurt, Jersey, Tunis and Genoa. It will also undertake some inclusive tour charter flights.

For scheduled services, the aircraft will operate

Right: A view of the 85% scale flying prototype of the new Beech Starship 1. The aircraft made its maiden flight on 29 August and certification of a full-scale version — with seating for 8-10 passengers plus crew — is scheduled for completion in 1985. Starship 1 features a tandem-wing design configuration, incorporating a 54ft 7in-span, aft-located sweptwing with 'tipsails' and a 26ft 6in-span forward wing. The aircraft will be powered by two pusher Pratt & Whitney PT6A-60 engines located inboard, and above and to the rear of each aft wing. Photo: Beech

with 150 seats at 32/33-inch seat pitch. On charter operations, the A320 is able to seat 162 passengers. Carrying a full payload, the A320 will be capable of operating non-stop on sectors up to 2,000nm.

Financial terms for the order have been agreed between BCal and Airbus Industrie. The fleet will be financed by conventional bank funding, secured against the aircraft.

Tucano enters service

Late-September marked the phasing into the inventory of the Brazilian AF of the first series production EMB-312 Tucano military turboprop trainers from an order for 118 plus 50 options contracted by the Air Ministry.

Eight aircraft were initially delivered: six specially fitted with underwing smoke generators to the aerobatic squadron *Esquadilha da Fumaça* and two to the Air Academy, both located in Pirassununga, State of São Paulo.

The *Esquadilha da Fumaça* (Smoke Squadron) was originally set up in 1952 with North American T-6 Texans, built under licence in Brazil during WW2 and then available in large numbers in the Air Force inventory. In the 1960s it was re-equipped with Fouga Magisters, later returned to France as part-payment for the Mirage IIIs and DBRs bought by the service, finally reverting to the T-6s shortly before being disbanded in 1977.

The reborn Tucano-equipped *Esquadilha da Fumaça* is officially designated *Esquadrão de Demonstração Aérea* (Air Display Squadron), or EDA for short.

The entrance of the EMB-312 Tucano into service at the Air Ministry is being preceded by the creation of a special commission, formed by highly experienced instructors, with the task of introducing the new equipment to the cadets. The group is presently studying and flying the aircraft in order to establish the training syllabus for the type.

JAL decides on 767

Japan Air Lines has selected the Boeing 767-200 and the stretched version 767-300 as the aircraft to add to its fleet from 1988 for domestic and short haul international routes. The decision to order Boeing 767s to replace some of the airline's retiring DC-8 aircraft was taken on 29 September and comes after a long study of several aircraft, including Airbus Industries' 310-200 and 300-600 and the McDonnell Douglas MD100. The 767 was selected after assessing JAL's requirements for a medium capacity airliner and also to suit the airline's long range corporate plan.

With its order for the 767-300s, Japan Air Lines becomes the lead customer for that version. The 767-300 features a fuselage lengthened by 21ft 3in (6.43m), to 176ft 1in (53.65m). Other differences between the 767-300 and the 767-200 — the standard version of which 66 are now in service with 11 airlines — will be a strengthened main landing gear/nose landing gear and wheel well, plus additional metal thickness in certain areas of the fuselage and wing lower surface. Passenger capacity of the 767-300 in JAL's configuration will be 254 seats in mixed class, compared with 211 seats in the 767-200. The first

767-300 is scheduled to go into JAL passenger service in 1987.

The 767ERs have the same dimensions as the standard 767, but increased fuel capacity to give a range of 5,700 statute miles (9,200km) with full passenger payload.

Both the 767ER and the 767-300 will have a maximum gross weight for take-off of 345,000lb (156,490kg), compared with the 300,000lb (136,000kg) maximum take-off weight for the original 767.

First MH-53E rolled-out

The world's first helicopter capable of providing the tremendous pulling power demanded by modern minesweeping equipment, the MH-53E, was rolled-out by Sikorsky on 14 September. The MH-53E, with its 13,140shp, provides up to 30,000lb of tow ension required to pull the US Navy's latest anti-mine hydrofoil sled and other equipment in conditions ranging up to sea state five. In addition to its role in the US Navy's Airborne Mine Countermeasure Mission (AMCM), the MH-53E will also serve to augment the service's need for heavy-lift helicopters in the

Vertical Onboard Delivery (VOD) mission and special operations.

The first aircraft, a production prototype, has been transferred to Sikorsky's facility at West Palm Beach, FL, where it will undergo more than two years of test flights, including qualification of the new composite tail rotor, dynamic at-sea tow tests, installation of the dual-digital automatic flight control system and installation of a composite tow boom of filament-wound graphite.

To meet the six-hour endurance requirement, the MH-53E has enlarged sponsons to carry 3,200gal of fuel which is used to power the triple-engine aircraft and turbine-powered generator on the MK-166 magnetic influence hydrofoil sled trailed in the water behind the helicopter during sweeping missions. The MH-53E will also trail gear for locating and neutralising mechanical-contact and acoustical-influence mines.

Production of the MH-53E is expected to begin in 1986, and the US Navy anticipates a need for more than 40 of the aircraft. The service will use the MH-53E to augment its squadrons of Sikorsky-built RH-53D aircraft that now perform the minesweeping mission.

747-200/300 conversion for KLM

KLM will convert and modernise 10 of its Boeing 747-200 aircraft into 747-300 extended upper deck configurations. The company currently owns 16 of the 747-200 models and the 10 examples destined for modernisation are those equipped with General Electric engines.

KLM is the first customer to take advantage of Boeing's offer, made to 747 users, to convert a limited number of 747-200 aircraft into the extended upper deck version (see last month's issue). In connection with this conversion KLM has advanced the delivery of its eighteenth Boeing 747 (also of the 747-300 version) by 16 months. Originally this delivery was planned for 1986, but will now take place in the autumn of 1984. The advanced date becomes necessary because during the conversion of the 10 Boeing 747s, each of them will become unavailable for a period of time, requiring an extra aircraft in that period.

The Dutch Government has been asked to approve the total investment involved in conversion and in the purchase of an eighteenth 747-300 which will amount to some \$200million.

French news

Airbus Industrie's A300 testbed flew for the first time on 14 September 1983 with an F-16-style 'Mini side-stick'. It was the first time that a conventional transport airliner has been fitted with this type of control stick, and after the 3hr 30min flight, test pilot Gordon Corps commented: 'The handling of the aircraft with the mini side-stick was very easy and precise. Although it looks very different from the conventional control wheel, I am sure that airline pilots will find it easy and like it, as it also provides a much better view of the instrument panel'.

Airbus A300 testbed has been fitted with a side mounted mini-stick which replaces the conventional control wheel at the captain's station while the conventional controls are retained at the first officer's seat. During the flight test campaign of 75 flight hours which will be concluded by mid-December this year, Airbus Industrie will examine the engineering, operational and certification implications of having a mini side-stick on the A320.

● The domestic French airline Air Inter has signed a purchasing contract for its eleventh Mercure, which will be added to its existing fleet in service since 1974. The aircraft was purchased from its manufacturer Avion Marcel Dassault-Breguet which had used it on development and certification flights. The aircraft will be set to Air Inter standard at the Dassault-Breguet Istres plant, where the Mercure was manufactured from 1970-74.

● Commemorating the arrival of the first of 64 Mirage FICRs ordered by the French AF, a ceremony was held on 7 September at the BA124 base at Strasbourg, home of the 33rd Fighter and Reconnaissance Squadron. At the same time a celebration was held to honour the 200,000th flight hour logged by the reconnaissance Mirage IIIRs and RDs of the *Moselle*, *Savoie* and *Belfort* wings.

● The US Air Force has decided to order the Durandal anti-runway weapon made by the French firm Matra. The order provisionally covers 350 bombs of an expected 3,000 round purchase and deliveries will be spread out up to 1986. Durandal will be carried by F-111s, F-4s and F-16s.

● The Reims-Cessna F-406 Caravan II made its maiden flight on 22 September, when the new twin-turboprop air utility aircraft flew for 2hr 35min and made five landings and take-offs. Certification is scheduled for the second half of 1984, and production is to start in the middle of that year.

DECEMBER 1983



Above: Presently undergoing flight testing is the new ATL (Avion Très Léger), a two-seat, side-by-side trainer built by Avions Pierre Robin. Photo: Avions Pierre Robin

Below: The Dauphin SA365N which has just completed 'deck landing' qualification tests (see 'airnotes' item, last month). Photo: SNIAS



Qantas selects Rolls-Royce for 747-300s

Qantas has chosen an advanced version of the Rolls-Royce RB211 engine to power the three Boeing 747-300 airliners which it ordered recently (see last month's issue, page 488). Installed engines and initial spares for these aircraft are worth over £45million. This is the first order for RB211 engines to power the Boeing 747-300 which has an extended upper deck. The order is also the first for the upgraded version of the RB211-524D4.

Tornados in Canada
Report by Graeme Hammond

THREE RAF Tornados of No 617 (Dam-busters) Squadron, RAF Marham, Norfolk, flew across the Atlantic and back in two non-stop, 3,500 mile sorties in the autumn.

The aircraft refuelled in flight from Victor tankers and a Vulcan tanker during the 8½-hour



Westland news

Below: A Westland Lynx has successfully completed firing trials of the Rockwell Hellfire anti-armour missile — the first firing of the American built supersonic missile by a non-US helicopter. The tests, which involved the firing of two missiles, were carried out using a standard British Army Lynx helicopter at the Hjerfenn range in Norway. Both firings scored direct hits.

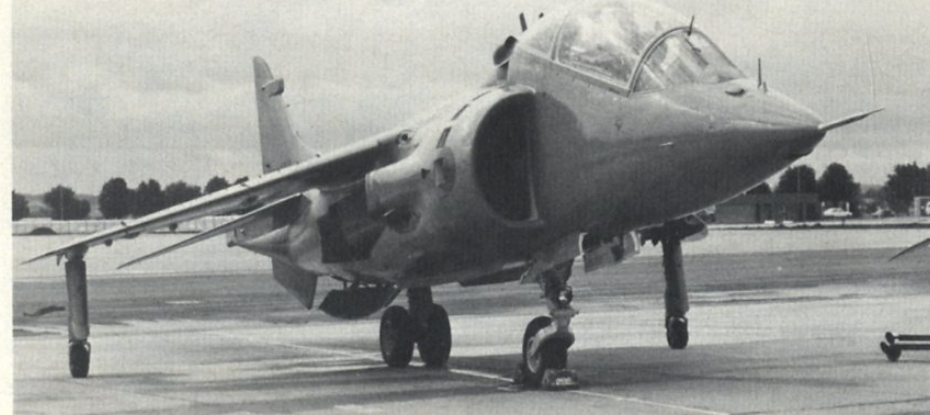
● The RNZNavy has taken delivery of two more Westland Wasp helicopters, bringing its Wasp fleet to seven. In service in New Zealand, the Wasps will operate from HMNZS Canterbury, Waikato, Wellington and Southland; the latter two frigates are currently undergoing refits prior to commissioning.

● The latest variant of the Westland 30, the 30-200, has made its first flight and is well into its development programme. The helicopter is designed to meet the needs of users who require a helicopter for operation at high temperature and with good single engine performance.

Photo: Westland Helicopters



The first of three Sea Harrier T4s for the Royal Navy is seen in its new Fleet Air Arm livery. The aircraft will be in service at RNAS Yeovilton by the end of 1983. Photo: RNAS Yeovilton



airnotes

● Rolls-Royce has signed an agreement with the Italian Government for the licensed manufacture of components and assembly of military Spey Mk 807 engines in Italy. The Italian-assembled Spey engines will power the AM-X tactical fighter aircraft being developed for the Italian and Brazilian air forces for close support and reconnaissance duties.

● Boeing Vertol has been awarded a third follow-on production contract for the CH-47 helicopter modernisation programme. The contract calls for the updating of 24 early model CH-47 to the advanced CH-47D configuration, and increases production from the current rate of two/month to three by October 1984. In addition funding is included for the purchase of long-lead time materials to modernise 36 CH-47s in fiscal year 1984 and 48 in 1985.

● The fourth Super Guppy for Airbus Industrie entered service on 2 August, joining the fleet which carries A300 and A310 sub-assemblies from the Airbus partners' factories around Europe to the final assembly line in Toulouse. Like the third Super Guppy, this aircraft was 'built' by UTA Industries at Le Bourget where it was rolled-out on 1 April. The first flight took place on 21 June. Airbus Industrie has contracted the Super Guppy operation to the charter carrier Aeromaritime, a subsidiary company of UTA. The Super Guppy is an extensively modified Boeing 377 Stratocruiser.

● The business and undertakings of Glos Air (Services), the Hurn Airport-based avionics and aircraft maintenance company, have been acquired by Norman Bailey Aviation.

● Marconi Space and Defence Systems is to supply a complete internal electric counter-measures system to the RAF for the Harrier force, under the first phase of an MoD order which could eventually be worth £100million. The system, codenamed Zeus, comprises an advanced Radar Warning receiver and a multi-mode jammer. It will be able to intercept, identify and jam a variety of transmissions including those from search, fire control, gun control and A1 radars.

● British Aerospace's Jetstream 31 light turbo-prop transport has successfully completed a four week programme of water methanol injection trials of the Garrett TPE331 engine in the US.

AIRCRAFT ILLUSTRATED

flights to and from the Toronto International Airport. During their visit the aircraft flew training sorties on Canadian low-level routes in Ontario and one Tornado displayed at the Canadian International Air Show.

It was the Tornado's public debut in Canada and a curtain raiser to further Canadian deployments. No 9 Squadron Tornados detached to RAF Goose Bay 11-31 October for intensive low-level, terrain-following training.

In the long-term it is planned that Tornado and other strike/attack aircraft — both UK and Germany-based — will use Goose Bay on a regular basis. The emphasis will be on terrain following low flying at night. The remote countryside of Labrador provides the ideal landscape for this type of training.

Tornado was the centre of particular interest during the Toronto visit — particularly by the Press and military aviators. The Tri-national aircraft was considered by the Canadians for re-equipping the Canadian Armed Forces. The final decision was in favour of the CF-18 Hornet —

The trials were carried out by the development Jetstream 31 (G-JSSD) which was modified with the new water methanol injection system and associated test equipment. The injection of water methanol into the engine is a technique which boosts the performance of aircraft under hot and high climatic conditions.

● A contract to train overseas helicopter instructors has been awarded to Helicopter Services Ltd (HSL) in co-operation with the College of Air Training at Hamble. The first course started at the beginning of September for a number of QHIs from the Middle East. Under the umbrella of a teaming agreement HSL has established a helicopter pilot training unit at the College of Air Training which will initially consist of three Gazelle helicopters, a CFI and two instructors, drawn from all three UK services, supported by licensed engineers.

● General Electric has delivered the first F101-GE-102 engine for the initial production B-1B strategic aircraft to the US Air Force. Three more powerplants for the B-1B flight test programme are scheduled to be delivered by the end of the year.

● Bell Helicopter Textron has been awarded two contracts for 21 AH-1S Modernised Cobras. This includes an \$18million order for 11 Cobras from the US Army (to be delivered from January 1986 through June 1986) and a \$19.2million sale to Pakistan for 10 AH-1S helicopters for early 1986 delivery.

● On 26 October Pan American World Airways celebrated 25 years of jetliner operations with an exact re-enactment of the first Boeing 707 service between New York and Paris. The 25th anniversary flight on a Boeing 707 sistership of the original, Jet Clipper America, retraced the flight exactly, including pre-departure ceremonies, identical routing (Idlewild International Airport [now JFK International] to Le Bourget, via Gander for refuelling) and in-flight service that reflected the era.

● Beech Aircraft Corporation has received an \$86.6million US Air Force contract for lease and support of 40 King Air B200C aircraft as part of the services Operational Support Aircraft T-39 replacement programme. This calls for the US Air Force to lease 80 jet and 40 turboprop aircraft for five years, with an option for three more.

● The first prototype of the Agusta A129 attack helicopter made its maiden flight on 15 September. Three flying prototypes will take place in the development test programme.

DECEMBER 1983

but the one-seat versus two-seat arguments continue and there were inevitable comparisons between the Tornado and the CF-18, which appeared in the same flying display.

Flying the Tornado at Toronto was Sqn Ldr Geoff Roberts and his navigator Flt Lt Tim Price and their display showed the aircraft's swing-wing ability to advantage. Interestingly, the Tornado was the only military aircraft to display with a representative weapon load — all the others flying 'clean'.

Together with a No 50 Squadron Vulcan tanker from RAF Waddington, Lincolnshire, flown by Sqn Ldr Joseph L'Estrange and a British Airways Concorde, flown by Capt Brian Walpole, the Tornado completed a trio of British delta shapes against the Toronto skyline and all three aircraft won standing ovations (unusual at an air display) from the huge crowds.

Now in its 34th year, the Air Show is claimed by the organisers to be the largest of its kind in the world. It forms part of the Canadian International Exhibition, held on the Lake Ontario waterfront

Airliner Orders

Airline	Aircraft	No	Ordered	Delivery date
Air Algerie*	Boeing 737-200	3	15 Sep 83	Oct 83
Alyemda*	Boeing 737-200C	2	11 Oct 83	m-84
British Caledonian*	Airbus A320	7-f	11 Oct 83	e-88(3) & 89/4
CP Air*	Boeing 737-300	3-o	11 Oct 83	n.d.
	Boeing 767	10	3 Oct 83	(see notes)
		(-4)	Oct 79	n/a
DLT*	BAe 748 srs 2B	1	4 Oct 83	1-83
Japan Air Lines*	Boeing 767-200	4-f	29 Sep 83	1986 (3) & 87 (1)
	Boeing 767 ER	2-f	29 Sep 83	1988
	Boeing 767-300	3-f	29 Sep 83	1987
	Boeing 767-?	6-o	29 Sep 83	1989-91
KLM*	Boeing 747-300	1	6 Oct 83	Sep 84
Northwest Orient*	Boeing 747-200	2	28 Sep 83	Apl & Jun 84

Notes

Airliner Orders

Air Algerie: The national airline of Algeria is one of Boeing's largest customers in Africa, with 11 727s and 14 737s delivered since 1971. The latest 737s are valued at \$50million and will be powered by Pratt & Whitney JT8D-17A engines.

Alyemda: Based in Aden, the carrier flies to cities in Arabia and East Africa as well as to Bombay. Future plans include extension of services to Sofia, Bulgaria and London. The Alyemda order brings to 1,114 the total number of Boeing 737s ordered, of which 981 have been delivered.

British Caledonian: See 'airnews' item.

CP Air: Under an agreement with Boeing, the airline has decided to substitute its order for four 767s placed in 1979 in favour of 10 Boeing 737-300s. CP Air cited decreased traffic levels throughout its route network as a primary influence on the decision to move to a smaller airliner size. Deliveries of the -300 to the airline will start in April 1985, with two more in May. Two each will be delivered in 1986 and 1987, and three in 1988. CP Air is the sixth customer for the -300 and Boeing now holds orders for 50 of the variant plus 40 options.

DLT: (Deutsche Luftverkehrsgesellschaft mbH). Operating in close co-operation with Lufthansa, DLT has operated three 748s over the past two years and the purchase of a fourth aircraft of this type will enable the airline to expand further its regional and international route network.

Japan Air Lines: See 'airnews' item.

KLM: The new order was announced at ceremonies marking delivery of the carrier's first 747-300 (see 'deliveries' section and 'airnews' item).

Northwest Orient: The new aircraft bring to five the number of 747s the carrier has ordered during 1983; earlier this year it purchased one 747F and two 747-200Bs.

in downtown Toronto. Three million paying visitors attend the Exhibition and the Air Show is seen by more than one million people who crowd the shoreline on each of the four flying days. After one of the displays two of the Tornados formed with Concorde on its approach to Toronto International Airport. Living up to the Squadron's motto *Apres moi le deluge* the three Tornados also overflew Canada's largest 'deluge' — the Niagara Falls.

The Air League Education Trust Flying Scholarships 1984

Applications are invited from men and women between the ages of 17 and 21 on 31 May 1984 for 13 Flying Scholarships. The winners, who will be entitled to 15 hours' flying instruction, will be selected on the basis of interviews, aptitude, and medical tests.

Write for application forms *before 30 November 1983* to the Secretary General, The Air League, 4 Hamilton Place, London W1V 0BQ.

Airliner Deliveries

Airline	Aircraft	No	Delivered	Date ordered
American Airlines*	MD-82	2	2 & 8 Sep 83	28 Sep 82
Govt of Mali*	BAe 146-100	1	17 Oct 83	3 Jun 83
Japan Air Commuter*	Dornier 228-200	1	15 Sep 83	26 May 83
KLM*	Boeing 747-300	1	1 Oct 83	Oct 82
Kuwait Airways*	Airbus A310-200	1	29 Sep 83	24 Sep 80
New York Air*	MD-82	1	2 Sep 83	n.d.
Trans World Airlines	MD-82	2	2 & 22 Sep 83	27 Oct 82

Notes

Airliner Deliveries

American Airlines: Continuing deliveries under the leasing agreement signed between the airline and McDonnell Douglas. Aircraft are s/nos 1114 and 1116 respectively.

Govt of Mali: Delivery of the order reported in Sep 83, p392.

Japan Air Commuter: The first of an initial two Dornier 228-200 ordered by Toa Domestic Airlines (see Aug 83, p344) for its newly established Japan Air Commuter regional airline. Following delivery of the second 228 planned for November, Japan Air Commuter will inaugurate scheduled regional services from Amami Airport in the southwest of Japan on 1 December 1983.

KLM: The first -300 for the airline is named *Sir Frank Whittle*. On receiving the aircraft KLM also announced a further 747-300 order and a modification programme whereby it will return 10 of its present 747-200s to Boeing for retrofit of the -300 upper deck.

Kuwait Airways: The airline is the first carrier outside Europe both to order and to take delivery of the A310, and it is also first to receive the A310-200 version with higher take-off weight. The Kuwait flag carrier, which has ordered three A300-600s as well as eight A310s, takes delivery of all of its 11 Airbus over the next year.

New York Air: Aircraft is s/n 1082.

Key:

n.d.=no details, m=mid, l=late, f=firm orders, o=options, n/a=not applicable, *=see notes.

Below: KLM's new Boeing 747-300, named Sir Frank Whittle, photographed during a pre-delivery test flight (see 'Airliner Orders and Deliveries' table). Photo: Boeing



ACA/EAP clarified

Sir,
I am writing with reference to Paul Humphrey's helpful piece on ACA/EAP in the August issue. I am sorry he is still a trifle confused about our technology demonstrator, the Experimental Aircraft Programme and the Agile Combat Aircraft. I agree, it can be confusing unless one lives very close to it (even then sometimes!). But I must point out, in all fairness, that the EAP was not entirely a case of 'Whammo! Just before the Paris extravaganza got off the ground there was all this chat about the EAP'. To illustrate my point, I enclose extracts from an MoD press release issued at Farnborough last year:

Statement by the Rt Hon John Nott, MP, Secretary of State for Defence New Experimental Aircraft Programme

'Farnborough International 1982 gives me the opportunity of announcing that MoD and industry are jointly to undertake a research **Experimental Aircraft Programme** which would bring together current component elements of demonstrator work and further advance our knowledge of the demanding technologies which will be essential to the high performance requirements now foreseen. This is essential work for future advanced fixed wing combat aircraft of either STOVL or conventional design.

'Major objectives will be to explore the many facets which contribute to high agility, the efficient use of composite materials, artificial stability, Stealth techniques and advanced cockpit and system designs to give maximum operational capability. Interactions of weapons, ECM/ESM, defence suppression, target acquisition, aiming, communications and data exchange will need to be studied also. Whilst not directly incorporated in the experimental aircraft, other work will explore specific future STOVL engine and hovering control techniques. The intention is that this research programme will cover technologies with potential application to a variety of possible future advanced agility aircraft, including STOVL, as well as to further Tornado improvements.

'The research aircraft programme which I am proposing will provide very practical, significant and relevant technological assistance, particularly in the field of new **Agile Combat Aircraft**, as proposed by British Aerospace, whilst we gain better understanding of the many operational, international and political issues involved, including the essential market and collaboration prospects and the central questions of costs and affordability.'

I am glad your correspondent liked our grammar and syntax. There's too little of it about nowadays.

With reference to his despairing cry in the last paragraph:-

- 1) Technology demonstrator is the Experimental Aircraft Programme by another name. It will fly at Warton in 1986.
- 2) It will be externally (and, to a large extent, internally) identical with ACA.
- 3) EAP is backed financially by the UK Government with MBB and AIT involved in the design and technology. The German and Italian Governments aren't involved — yet.
- 4) ACA is a joint BAe, MBB and AIT design but no one (except BAe) is committed to participate — not MBB, AIT, the UK, German or Italian Governments — yet.

The ACX demonstrator, as yet, has no French Government contract behind it nor are there any partners involved. We hope for a German/Italian (and French, maybe?) decision early next year.
ALEXANDER F. JOHNSTON, *Public Relations Manager, BAe Warton*

Paul Humphries replies: Thank goodness for helpful — and alphabetic — readers like Mr Johnston. There was your correspondent, crouched at the typewriter, completely 'fuzzed' about the ACA/EAP in spite of the faint memory of John Nott's statement at Farnborough '82. Now ACA/EAP expert Mr Johnston has 'unfuzzed' me fast, and I am most grateful to him. As will be all 'airscan' readers. And why is Mr Johnson alphabetic? His kind and explanatory missive employed 16 capital letters of the alphabet. But the grammar and syntax are still impeccable.

'Tanking 25' corrections

Sir,
The article in the August issue of *Aircraft Illustrated*, entitled 'Tanking 25', was most interesting but, in the interests of historical accuracy, may I point out a few errors which have crept in.

The Meteors used in the early flight refuelling experiments were of two types, the F4 as mentioned, and the F8. However, only the F8 was used by No 245 Squadron, the earlier model being involved in purely non-service trials. Incidentally, in addition to the Lancaster, both Lincoln and KB-29 tankers were used.

The decision to convert the Mark 2 Victor for tanking was taken long before the time stated. 1974 was the year the SR2 was retired, but the conversion programme was based mainly on the B2BS aircraft, which had languished at Radlett for several years before Woodford took charge of the job in 1970-71. The other K2 conversions not mentioned in the article were XL513, which was written off at Marham in September 1976, and XL158, XL233, XL511 and XL512, all of which are still current.

My final comments concern the photographs. The Sea Vixens shown in fact belong to No 890 Squadron, as denoted by the '750' series codes and the flying witch badge on the tail, and the KC-97 is an 'L' model, not a 'G', possessing underwing jet-pods in place of the earlier drop-tanks.

S. J. BOND, *Holyhead, Gwynedd*

British Aircraft in Exile

Sir,
I am preparing a book which will list those aircraft of British manufacture or design which remain in existence beyond the shores of the British Isles.

The listing will not include aircraft of postwar design which are still flying regularly but aircraft which were designed in or before 1945 will be recorded along with all appropriate aircraft in the 'Wrecks and Relics' categories throughout the world.

Material for the book is coming in well but many of your readers will know of aircraft which persistently escape the published records of museum aircraft. Many will be off the beaten track at lesser known airfields, training establishments, fire dumps or in the many odd places where aircraft are displayed or restored. These, in particular, are the aircraft of which I should like to hear and I should be very grateful for any information which your readers may be able to give me in ensuring that the book provides as near complete a documentation of surviving British aircraft as can possibly be achieved.

LLOYD P. ROBINSON, *3 Branscombe Gardens, Darcy Lever, Bolton BL3 1RL*

Support for the aircraft preservation movement

Sir,
It is now 16 years since 11 organisations of a very varied origin were brought together to form the British Aircraft Preservation Council as a body to co-ordinate efforts to preserve, restore and exhibit historic aircraft in flying or static condition and to secure other tangible aspects of aviation history for the education and interest of present and future generations.

In the time which has elapsed since the formation of the Council the membership has grown to over 80 UK collections supported by more than 30 British associate member organisations. Twenty-five overseas museums also enjoy associate membership and contribute to the continuing exchange of information and material.

The cause of aircraft preservation has progressed considerably in the past 16 years and many of the collections of 1967 have grown almost beyond recognition with many ambitious plans afoot to erect buildings and to bring aircraft under cover for restoration and display. But it is, perhaps, timely to remind everyone with a professional, nostalgic or enthusiast interest in aviation that support is needed in all aspects of aircraft preservation if the momentum of progress is to be maintained.

Each and every reader is invited to consider whether he or she can help to secure Britain's aviation heritage in one or more of the following ways:-

- 1) By joining and working with one of the Council's member organisations — there is almost certainly one within reasonable distance of your home.
- 2) By visiting and supporting the many museums of aviation.
- 3) By advising the British Aircraft Preservation Council of any aircraft, engines, pictures, records or souvenirs which are worthy of preservation.
- 4) By sponsoring a preservation project.
- 5) By making a donation to the funds of the Council or one of its member organisations.

Anyone who can help in any way or who would like to know more of the work and membership of the British Aircraft Preservation Council is invited to contact me at the address shown.

BRIAN R. ROBINSON, *BAPC Information Officer, 9 Brackley Road, Heaton Chapel, Stockport SK4 2QT*

Lady Be Good

Sir,
With reference to M. W. S. Hetherington's letter in the July issue requesting information on the Liberator 'Lady Be Good', a book entitled *The Lady Be Good: Mystery Bomber of World War II*, by Dennis E. McClendon, fully describing what happened to the plane, its eventual discovery, and the fates of its crew, was published in 1962 by The John Day Company, New York, and Longmans Canada Limited, Toronto. This book is still in print, and can be obtained from Aero Publishers, Inc, 329 West Aviation Road, Fallbrook, California 92028, USA, for \$13.95 plus P&P. It is available to UK readers from: Arms & Armour Press, Lionel Leventhal Ltd, 2-6 Hampstead High Street, London NW3 1QQ.
IAIN C. WALKER, *Ontario, Canada*

● Letters on aviation topics are always welcome, but correspondents should enclose a stamped self-addressed envelope if they require acknowledgement of receipt. The editor regrets that he cannot enter into personal correspondence with individual readers.

James Goulding

Weapon kits

Recently received for review are the first examples of a new range of kits in 1:72 and 1:48 scale produced by Hasegawa depicting aircraft weapons in current use by the US Air Force and US Navy.

In 1:72 scale 'Aircraft Weapons: III' covers US air-to-air missiles and gun pods. In this box there are: four AIM-9B Sidewinders, four AIM-9D Sidewinders, four AIM-9E Sidewinders, four AIM-9J Sidewinders and eight AIM-9L Sidewinders; four AIM-7E Sparrows and four AMRAAM 'Sparrow replacement missiles'; six AIM-54 Phoenix missiles; four AIM-4D Falcons and four AIM-4G Falcons; two SUU-20 bomb and rocket training pods; two GPU-5/A (GEPOD-30) 30mm gun pods; and two each of the US Air Force and US Navy-style launches for Sidewinders.

'Aircraft Weapons: IV', also in 1:72 scale, is a set of air-to-ground weapons, ECM pods and towed target. The items in the box are: four AGM-12B Bullpups and two AGM-12C Bullpups; two AGM-78 anti-radiation missiles; two AGM-45 Shrikes; two AGM-88 Harm anti-radiation missiles; two AGM-62A Walleyes, two AGM-84 Harpoons; six AGM-65 Mavericks; two ALQ-87 ECM pods; two ALQ-101 ECM pods; two ALQ-119 ECM pods; two ALQ-131 ECM pods; two RMU-10/A reel units and two TDU-10B towed targets; two LAU-88A triple launchers; two LAU-34A launchers, and two LAU-77A launchers.

These two kits are most welcome, not only for the wide range of weapons, pods and other items that are included, but also for the fact that most of the items are shown in much greater detail than when produced before in aircraft kits. It is pleasing to have a variety of ECM pods other than the well-known ALQ-119, which has appeared in numerous kits, but not in such detail. The 30mm gun pod and training bomb and rocket pod (complete with six practice bombs) are unusual items which will be most useful. The towed targets and reel pods are another deviation from the usual under-wing stores. These kits are a splendid idea, extremely well produced, and with decals provided for various markings and stencils. It would be nice to see Hasegawa extend the idea to a range of weapons, pods and tanks for use on WW2 aircraft, including all the British and US bombs and mines. Some of the British and US bombs — particularly the latter — have been reasonably well represented in larger kits and to a lesser degree in 1:72 scale, but many of the British bombs have not been accurately portrayed. There are two excellent 1:72 scale Lancaster kits, by Airfix and Matchbox, but some of the important loads carried by the big Avro bomber cannot be shown on the models. A 4,000lb HC bomb was included in the latest Airfix Lancaster BIII kit, but the 8,000lb HC and 12,000lb HC as well as various types of smaller bombs and target markers, were frequently carried. There were many other more unusual weapons, such as 12,000lb Tallboy, the 'B' bombs, short varied bombs for the Mosquito, the long 2,000lb armour-piercing bomb and the packs of small incendiaries. Even the very commonly used standard 1,000lb MC bombs would be very welcome.

Our samples of these interesting Hasegawa kits were kindly supplied by Amerang Ltd. The cost is not yet known.

A big Prowler

The Prowler is the subject of a new kit in the Airfix range of 1:48 scale models. This is a model which should give plenty of scope for super detail enthusiasts and should please fans of US Navy aircraft. The model is moulded in grey plastic, which is of rather soft quality. Care should be taken when sanding down areas not to remove surface detail or sharp edges of such things as wing fences or aials. There are some disappointing aspects to this model and moulding standard is one of them. The review sample suffered some sinkage on a few components and one wing half had a small area where the plastic had not fully filled the mould. I hope that this kit is not representative of the general run of production of the Airfix EA-6B Prowler.

The four-man cockpit has good instrument panel detail and excellent crew figures, but the ejection seats look rather lacking in detail for a model in this scale. The large canopy and wind-screen is beautifully moulded in tinted plastic, which look most effective. The moulding of these components in much harder plastic is very sharp, and one wonders why Airfix so often uses a rather soft plastic, as compared to other kit manufacturers.

The external surface of the Prowler is notable for the numerous bumps, fairings, fences, strap plates, etc, much of which looks like afterthought. It is an aerodynamicist's nightmare, but adds interest to the model. The large ECM fairing at the top of the fin adds another bizarre shape to the fuselage.

The nose and undercarriage legs are fairly plain in appearance and greater detail would be an advantage in a model of this size. The under-carriage bays and doors are very disappointing because of the lack of internal detail. There must surely be some visible structure inside the bays and one would expect at least skin plating and operating jacks and hinges on the doors.

There are four pylons under the wings and a pylon under the fuselage. In the kit there are two long-range tanks and four ECM pods, with propeller-driven generators. Combinations of these stores can be installed on the pylons, such as one tank and four ECM pods or two tanks and three ECM pods. The propellers on the pods do not look convincing and the blades need improving by filing to an aerofoil shape.

A fine decal sheet gives markings for two Prowlers — one from VMAQ-2, US Marines Corps, and one from VAQ-131, US Navy. The sheet is very detailed and in addition to the basic colourful décor of these subjects there are numerous stencils and markings for pods and tanks.

A criticism I have often made about Airfix painting charts is that only its own paint colours and numbers are mentioned. Of course, Airfix wants modellers to buy its paint, but surely it would be instructive to mention the true colour name and number and give the nearest Airfix paint equivalent. An alternative would be for Airfix to completely overhaul its paint colours and match them exactly to a range of widely used colours — such as the basic RAF British Standards colours and US Air Force and Navy Federal Standards colours. On the Prowler chart the upper surface colour is given and M13 Light Aircraft Grey (the true Light Aircraft Grey is an RAF colour — British Standards 381c: 627) whereas the true colour should be Light Gull Grey — Federal Standards 595a: 36440.

This is generally a good kit which should please US Navy fans. It costs £5.80.

A Mirage from Hasegawa

Hasegawa has now released a kit of the Dassault Mirage F-1C fighter-bomber in 1:72 scale.

This is the third 1:72 model of this elegant aircraft, in my opinion the most attractive and

aesthetically-satisfying of the Mirage family. Unlike the other Mirages the F-1C departs from the pure delta-wing formula, having a conventional high-mounted swept wing and low-set tailplane. Its fuselage, however, shows a marked family resemblance to the Mirage III series. The adoption of a conventional layout was presumably to produce a more versatile fighter-bomber with a better landing and take-off performance and able to use unprepared airfields in forward areas of a war zone.

So far there have been three kits of the Mirage F-1 in 1:72 scale, by Airfix, Heller and now Hasegawa. The Heller model is unique in giving parts for the modeller to choose either the F-1C single-seat fighter or the F-1B two-seat trainer, the only model of the two-seater thus far.

The Hasegawa F-1C is moulded in the usual clean, precise style of this company and the overall shape is good. The fit of parts is superb and I did not find it necessary to use any filler on joints. My only criticism of the fuselage shape is that the area immediately forward of the jet pipe should be slightly more bulged along the top line, but this doesn't seriously affect the appearance of the model. This slight change in the aft fuselage top line is shown on the marking and painting guide on the instruction leaflet, but does not show up sufficiently on the model. Surface engraving of raised skin and panel lines is very nicely done.

The Mirage F-1 achieves short take-off and landing runs by virtue of flaps over a good proportion of the wing span, small ailerons and roll control augmented by perforated spoilers on the aft upper surface of the wings. The wing leading edges can be drooped to increase camber and therefore lift. The layout of these flight controls can be seen in a fine representation on the model. The large twin speed brakes, also perforated, are separate components in this kit, as are also the operating jacks. The speed brakes can therefore be cemented in the open position if desired.

The cockpit has a good ejection seat and control column, and there are decals for the main instrument panel and side console panels. The canopy and windscreen are separate to permit the former to be cemented in the open position. There is an entrance ladder and standing pilot figure.

Detail is good on the main and nose under-carriage legs, but the main wheels are set too wide apart and the tyres are too wide. This results in the wheels being rather too heavy in appearance. The fixed flight refuelling probe is included.

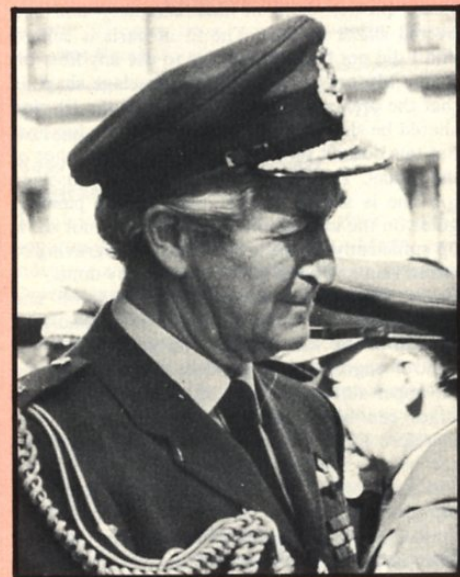
The centre pylon under the fuselage has a large fuel tank installed (pylon and tank are integral components), and here this kits differs from both the Airfix and Heller versions in that it does not have the four-bomb carrier for an alternative load in this position. The Hasegawa model carries the armament of an interceptor, having just the inner wing pylons housing Matra R530 missiles. Matro R550 Magic missiles are carried on the wing-tip carriers. The replica is rightly designated the F-1C, which is the pure interceptor variant. The other members of the family are the F-1A specialised ground attack aircraft, the F-1B/D two-seat advanced trainer and for tactical missions, the F-1CR photographic reconnaissance and the F-1E advanced attack version. The Airfix kit roughly covers the F-1C and F-1E versions and the Heller version is the F-1C, F-1B or F-1E (although it could also be used to model the F-1A as the kit includes the fin extension, but not the bulge under the nose, possibly for a laser target designator).

Markings are given for an F-1C of *EC1/5 Vendee*, an F-1C from *EC1/12 Cambresis* and another from the same squadron in the 19th Tiger Meet colours.

Our example of this good kit was kindly supplied by Amerang Ltd, the Hasegawa distributors in the UK. The kits costs £2.49

Behind enemy lines

Marshal of the RAF Lord Cameron GCB, DSO, DFC recalls his WW2 experiences operating behind German lines in the Western Desert



Marshal of the RAF Lord Cameron flew as a pilot in the Battle of Britain and thereafter on several wartime tours on fighter and fighter bomber squadrons, being twice decorated.

After the war he had a wide and varied career, when apart from his official appointments he became known as a profound thinker on defence matters; and also played an active part in RAF rugby. In 1976 he was appointed Chief of the Air Staff and in 1977 Chief of Defence Staff, where he established a considerable reputation for outspokenness and grasp of the political realities.

Since retirement in 1979 he has retained a close interest in defence matters, speaking and writing extensively in defence journals and the media; and acting as chairman of the Trustees of the Royal Air Force Museum.

He is currently the Principal of King College, London and was recently awarded a Life Peerage.

THE Western Desert is undoubtedly the right place to fight a war — that is if wars have to be fought. Wilfred Thesiger, one of the great desert travellers and writers, has said about the desert — 'No man can live this life and emerge unchanged. He will carry, however faint, the imprint of the desert, the brand which marks the nomad; and he will have within him the yearning to return, weak or insistent according to his nature. For this cruel land can cast a spell which no temperate climate can match.'

There were of course many who hated the Western Desert but they would have hated most places. For many of the operations there were their first wartime or perhaps any adventure. The desert can cast its spell. There was comradeship, the operational *esprit de corps* of a good squadron, the meeting up with many friends, the patrols and air fighting during the day (and sometimes at night). The celebrations after a victory in the air, the uplift with the arrival of the beer ration. The rising before dawn to get up for a patrol. The smell of the dawn desert and of Merlin engines being run up as aircraft came on to readiness. The nervous, queasy stomach, the mud-like tea, the breakfast eagerly eaten after a sortie. The return to readiness as the sun came up and the full heat of the desert came into the body. The hanging about waiting for a scramble or a set operation, the terrible heat of climbing into the cockpit of a metal aircraft at midday, the formation manoeuvring for take-off on the ground in dust clouds, the delicious feel of cold air flowing into the cockpit as you gained height. The comfortable feeling of seeing your friends and colleagues forming up around you. The voice of the controller giving the first indication of enemy activity over the Alamein positions — the first tally-ho. The few hectic minutes of life and death. The order for home. Wheels down and back safely to the duty operations tent. The probing questions of the squadron intelligence officer and the Army liaison officer. This was a typical day. Perhaps you operated or flew three or four times. Then came release as the desert dusk spread. A bath of some sort, a drink if there was one, some food and the camp bed.

Yes, the Western Desert is a marvellous place to fight a war. There were few local people to get hurt. The Senussi nomads move freely about the desert and they got the message that it was a good time to be elsewhere. The main sufferers were the combatants who introduced themselves into this strategic area. The surface of the desert is on the whole a mixture of rock and sand but often there are areas which are hard sand and from which it is possible to operate an aircraft. These areas, some treated artificially to an extent, became the landing grounds for the Desert Air Force. They were very

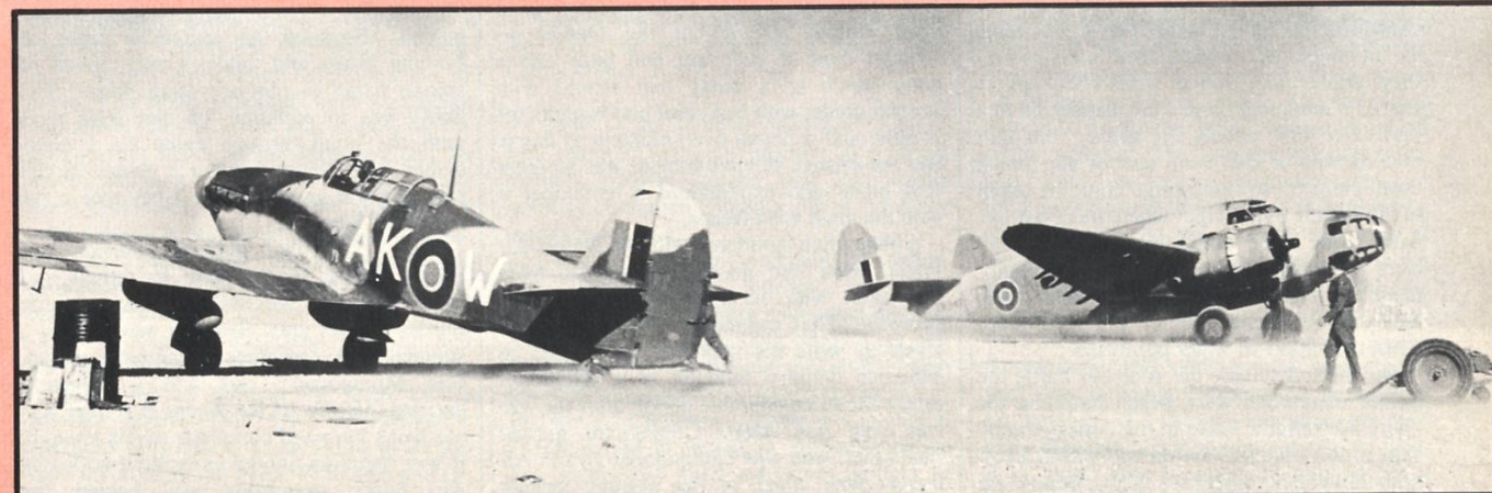
adequate, though aircraft systems could get very badly eroded by the constant dust storms that were generated by vehicles, aircraft and certain meteorological conditions.

Maintenance of aircraft was difficult and as usual the Royal Air Force ground crews worked miracles to keep operations going. They were of course handling aircraft that were mostly old and had been out in the area for some time. Many of the reinforcements which had been intended for the desert war had been sunk in various convoys in transit from the United Kingdom. The flow of Spitfires to the theatre had been abysmally slow and the Hurricane Mark IIC force was coping with Messerschmitt Bf 109Fs and Bf 109Gs — both aircraft with a greatly superior performance to the Hurricane except perhaps in the turning circle. Two of the four cannons had been removed from the Hurricane IIC to give it a better performance. But while it is useful to be able to turn inside your enemy in air combat, if the speed differential is so great then it is difficult to take offensive action against your enemy. Such was the case in the desert. This, coupled with the operational direction that the Hurricane force was to operate at about 10,000ft, made the Hurricane very vulnerable to the German and even Italian fighters. The reason was that the commanders felt it was useful for the Army to see they were being protected, particularly against Ju 87 attack. It was quite common for a squadron or wing from its patrol line in and around El Alamein to be able to see the German and Italian fighters taking off from their airfields at El Fuka and El Daba. Within minutes they had climbed above the Hurricane force and could carry out their dive and climb attacks almost at will. The Hurricane tactic was to turn the wing or the squadron into the enemy whilst they were in their attack dive with the hope of someone in the formation getting a deflection shot whilst on the turn or if one of the German fighters got a little careless. This tactic, defensive though it was, got some surprisingly good results. But really one of the main aims of the Hurricane force was to protect the Army from the Stuka attacks which were not infrequent and of which the Royal Air Force got little warning because of the almost total lack of radar cover. There is no doubt that these Hurricane anti-Stuka patrols helped to reduce the weight of attack against the Army, but in putting themselves in such a vulnerable position in the sky the Hurricane force took heavy losses.

The morale of the Desert Air Force after the retreat to El Alamein was on the low side and no wonder. They had been on the move nearly every night, flying and operating hard during the day, and living very rough. Yes, so were the Army, but the Air Force had to keep some fairly sophisticated equipment working and also to keep operational flying skills going amongst aircrew so that the maximum effectiveness was obtained from them.

Living conditions were tough and aircraft stood out in the desert storms and took their chance of surviving. The tented camp was designed so as to be movable at very short notice. There was an HQ trailer and the

AIRCRAFT ILLUSTRATED



Top: Behind German lines — Hurricane IIC, AK-W HL883, of No 213 Squadron and a Lockheed Hudson of No 117 Squadron at LG125 in November 1942.

All photos reprinted from RAF at War

Above left: 'Bivvy'. Typical Desert Air Force 'accommodation', 1940-43.

Above: The Hurricane's main adversary in the Western Desert was the Messerschmitt Bf109, an example of which was photographed undergoing maintenance under a baking African sun.

Left: Take-off. Douglas Bostons of No 24 Squadron SAAF leaving their desert landing ground for an operation.



**ROYAL
AIR FORCE
AT WAR**



Edited by Air Chief Marshal
Sir Christopher Foxley-Norris

squadron doctor also had a trailer used as a consulting room, but otherwise it was tents for all concerned to make their home as best they could. The officer and NCO pilots shared a mess and there were usually six to a tent. The first action on getting the tent erected was to dig some sort of slit trench fairly close by so that refuge could be taken in the middle of the night when the desert airfields came under attack by Ju 88s or Dorniers — which was most nights. The equipment for hygiene was a canvas wash basin and the occasional use of a canvas bath when the supply of water permitted.

Before and during the Alamein battle the fighter squadrons were based back on the Cairo-Alexandria Road in the Amiriya area. This meant that Alexandria was within a two hour drive. The difference of the desert tent to one of the fine suites of the Hotel Cecil in Alexandria was quite out of this world and to drive out of the sand storm of the desert to the clear air of the sea coast as one approached Alexandria was a never-to-be-forgotten experience. The excursions to Alexandria did not, of course, last long but every moment was made to count and if the squadron did not manage three night clubs during the evening they felt they had failed. There was a very popular dancing act of two Lebanese sisters who performed at all three night clubs and they were assured of a following if the squadron was in town. Alexandria, the summer home of Egyptian kings and queens was a much tried city. Certainly life in the Desert Air Force had a mode all of its own. As the El Alamein position consolidated, the two great and historic cities of Cairo and Alexandria became the main goal posts standing behind the 8th Army and its associated Air Force. If the Afrika Korps had driven through to the goal posts of these cities and the Nile Delta, then the war would have taken a very serious turn for the Allies. Few realise how very close the Axis came to achieving this aim. At the time of the Battle of Alma Halfa for instance in September 1942 they were certainly within a reasonable day's drive of the capital of Egypt. In the meantime life went on in these two cities as if nothing very much was happening. True, some of the braver staff officers in HQ Middle East were beginning to burn their papers and think longingly of the Levant, but the hoteliers and the Club owners in Cairo and Alex were made of sterner stuff. So if it was possible to get back to the 'Delta' for a moment for some reason or another one quickly entered a very different world. The great hotel 'Shepherds' in Cairo (later to be burnt down) was still very much in business — if you could afford it. Certainly there were others less dignified but quite adequate. The Continental Savoy bar was a good meeting place for the Air Force and if someone was in town he would usually appear there sometime during the evening. During the day it was swimming and drinking in the Gezira Club where there was golf, tennis and adequate food and drink. The Gezira 'John Collins' was notorious. There was no shortage of restaurants which always seemed to be well stocked — so one lived in some style.

It was always a levelling experience to fly

back from, say, Cairo's Heliopolis airfield to your landing ground in the Desert — straight from a bedroom and bath and a good lunch to a dusty tent shared with several others with bullybeef and biscuits for supper, and a patrol over Alamein at dawn. But the change of environment was so great that most who experienced it remember it with the most vivid feelings.

I have often wondered why the Desert Air Force never had its due recognition from historians who have studied the Desert campaign. The Commander Eighth Army survived to write his memoirs and indeed to influence military thinking to a significant extent for a considerable period after the war was over. AM 'Mary' Coningham, a New Zealander, who was Commander Desert Air Force, was killed in the ill-fated airliner 'Star-Tiger' which crashed near the Azores in January 1948. His memoirs were not published nor his analysis of the operations of the Desert war. They would have made interesting reading. After all the Desert campaign saw the start of the close co-operation in the field between the Army and the Royal Air Force which was the pattern to be carried across to the great operations in North West Europe.

To give Gen Montgomery, as he was then, credit, he was a dedicated advocate of army-air co-operation and the techniques that emerged were largely the result of the liaison that developed between him and Coningham. Relations between them were turbulent at times but no more than you would expect from two characters of powerful personality. The historians have suggested that Montgomery was sometimes over-cautious in his build-up before a battle and certainly he liked to have an element of superiority before launching an attack. He has also been criticised for being a little slow in the follow-up after a successful action such as El Alamein. The Air Force on the other hand managed to achieve a significant degree of air superiority from a fairly early stage when things were going badly on the ground but this was not achieved without a casualty rate equalling that of the Battle of Britain — at times it was worse.

I know the squadron I was in lost six aircraft in one day. During the retreat to the Alamein position and during the battle of Alma Halfa and thereafter, the Desert Air Force kept up a continuous assault against the Afrika Korps positions. Without this assault there would have been no Alamein and no victory and the course of the war would have been considerably different. The air cover produced by the Hurricanes and, at first, the few Spitfires and the constant attacks by Bostons, Baltimores, Tomahawks and later Kittyhawks (and Wellingtons by night), established not only air superiority, but helped the Army to fight the land battle; all as it should be.

The purpose of this piece, however, is not to write a history of the Desert Air Force but to describe an interesting operation which took place soon after the Battle of Alamein was over. The Battle started on the night of 23 October 1942 with the first penetration of the enemy minefields and an intensive artillery barrage, and a wide variety of air

attacks. The early morning Alamein fighter patrols witnessed an incredible sight of burning tanks and vehicles and clouds of smoke rising to our operating height. The battle was to continue for nine long days until the break-through came on 1 November. The Desert Air Force played its full part and was going to play a key role in the pursuit of Rommel.

By 12 November 1942, the German and Italian Afrika Korps were in retreat and heavy fighting was taking place in the Bardia-Tobruk area. Rommel was fighting a staunch and determined rearguard action. Gen Montgomery and AM Coningham, decided that the Afrika Korps in retreat was not being harassed comprehensively enough. It was therefore agreed to deploy two Royal Air Force squadrons well behind the German lines to carry out a series of attacks against Rommel's lines of communication. It was a bold and imaginative plan.

As mentioned before, there are certain areas of the Western Desert which are of hard sand, and it was possible for a wide-undercarriage aircraft like the Hurricane to operate from such a surface. The task force was to consist of Hurricane squadrons No 213 and No 238, armed with two 20mm cannons. Both were well-tried Desert squadrons already with some experience in ground attack operations, which was unusual in fighter squadrons at that time.

The main operational problem could clearly be navigational. Landing Ground 125 (as it was numbered) was deep in the desert and the area involved had few landscape features of use. Radio silence was to be maintained, as far as possible, for the whole operation. There were no navigational aids. The compass and the watch were to be the main aids. The map was useless.

The plan was for the two squadrons to be led to Landing Ground 125 by a Lockheed Hudson, an American aircraft much used by the wartime Royal Air Force in the Western Desert in an air transport role. The Hudsons would also ferry in essential supplies to keep the squadrons going for the length of time they would be behind enemy lines. The plan was that the operation would go on for three or four days depending on how long it took for the enemy to find out where the attacks were coming from and to retaliate.

The two squadrons were allowed to take only the bare operational necessities to keep them flying. Arrangements were made for the aircraft of a large amount of 20mm ammunition, as it was expected that considerable quantities would be expended in the type of attacks envisaged. Pilots were allowed the basic minimum of personal equipment, only flying clothing and escape kits. Most of us slept in our aircraft, shaving was not required, indeed there was precious little water for even the most basic hygienic purposes. Two cooks came with the party with basic rations for keeping the squadrons going for a few days. Some expert travellers amongst the aircrew managed to find room in the Hurricane for a few cans of beer and those enlightened ones became extraordinarily popular. Supplies did not last long.

The three Hudson aircraft positioned on

our departure airfield (if you could call it that) on 12 November and loading operations started immediately and went on all night. The main briefings were completed and all was ready. There was no denying the adventurous nature of the operation, and the more experienced pilots were selected to take part. There was of course the chance of a total debacle if our landing ground was discovered. There was much apprehensive excitement in the aircrew mess the evening before departure.

The Intelligence was clear. Rommel and his forces were retreating and our task was to make life as difficult for them as we possibly could. This type of subversive operation was new to us all. Some of us had been involved in the Battle of Britain and the first offensive sweeps over France, but this was entirely original and exciting. At dawn on the morning of 13 November 1942 we set course for 'Landing Ground 125'. We settled into loose formation with the Hudsons and hoped their navigators were well on the ball. The flight was due to last about two hours. The Hurricanes were fitted with long range tanks. The operations envisaged (as we soon found out) would stretch fuel capacity to the limit.

Before the operation started the Long Range Desert Group had carried out a reconnaissance of the area and the RAF's No 2 Armoured Car Company had been selected to provide ground support. The existence of this famous RAF desert unit dated back to the Trenchard concept known as the 'Air-Pin', of using air forces to control local tribes in Iraq without using large numbers of soldiers. The technique had worked well and the RAF Armoured Car Companies were kept in existence, later becoming part of the RAF Regiment. No 2 was commanded by a fabulous character called Sqn Ldr Cassano who had been in one desert or another for many years. He knew his Senussi desert well and the Company boasted several other experienced desert warriors.

It is worth pausing here to look for a moment at this man Sqn Ldr Cassano. He had joined the Royal Air Force to fly. I don't know what happened to his flying career, but he became one of the great characters of the Western Desert. He was a man of medium height with jet black hair and a black moustache. He could have been taken for an Arab. His uniform when he was in the desert was unconventional to say the least. Some declared that they had seen him in Cairo looking quite smart and he seemed to know where the ladies were to be found. As the Commander of No 2 Armoured Car Company, which he led for two years, he became quite a legend and even the Army were prepared to acknowledge his operational effectiveness. He had operated with the 11th Hussars — the Cherry Pickers — and they knew him well. He had been decorated with the Military Cross for an action when his Company had been attacked by a force of German and Italian bombers when operating in the open desert. They suffered many casualties and there was much heroism but the squadron recovered and was soon operational again.

I would like to quote from his operational log when he accompanied us behind the German lines. It ran like this:

'11 Nov — At 12.15hrs Sqn Ldr Cassano MC received order to proceed to a secret forward landing ground well into enemy territory. Company moved off at 12.30hrs (no waste of time).

12 Nov — Company reached "the wire" (the Egypt/Libyan border) at Fort Maddellena. At 14.15hrs a German warrant officer who was proceeding back to his unit was taken prisoner having walked five days due west (presumably he joined the party).

14 Nov — Company arrived at LG 125 at 12.00hrs and immediately formed a defensive screen 50 miles out from airfield to observe hostile air or surface enemy forces.

16 Nov — Half section under Flt Lt Palmer proceeded to area 60 miles SE of LG 125 to search for crashed aircraft.

17 Nov — Withdraw from area at the end of the operation'.

Sqn Ldr Cassano was eventually badly wounded in Tunisia and had to hand over command of the Company. (The Royal Air Force has some exciting characters who do not necessarily fly aeroplanes.)

So the armoured cars had worked their way behind the German lines and thrown a defensive screen around LG 125 ready for the arrival of the aircraft. The screen had a radio warning link with the main control car, situated close to the airfield.

Our course took us well south of the area of operations and after two hours flying over pretty featureless desert the Hudson leader led the formation down over the strip that we were to use for the next few days. The actual strip was marked out by a line of petrol drums and it was on to this patch of relatively hard sand that the Hurricanes landed. Once on the ground, the first task was to disperse and refuel the aircraft from petrol drums already flown in by Hudson. There was very little cover. The refuelling was achieved by using stirrup pumps originally intended for putting out fires during the Blitz. This method was to prove extremely handy in the days ahead. The second task was to dig slit trenches so that there would be some sort of protection if things started to go wrong.

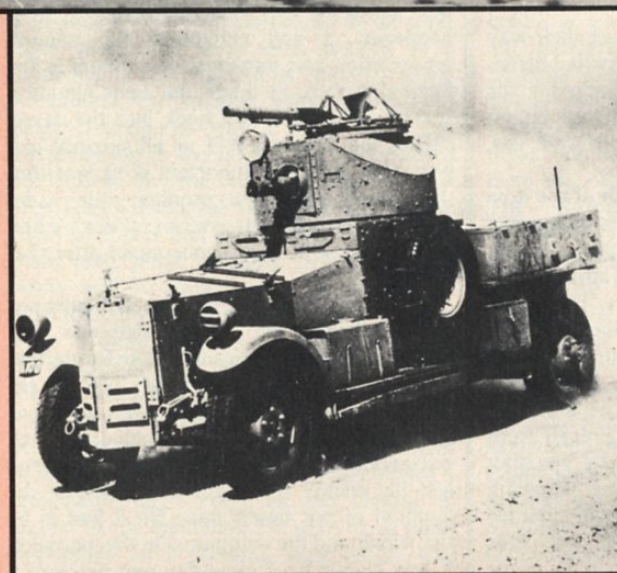
That afternoon 213 Squadron operating as two flights, one of which I led, took off for an attack on road communications in the Agedabia area. It was to be an eventful sortie. We set out in a loose grouping which was less tiring on a long trip. After about 45 minutes I called my flight into closer formation. When we were about 10 miles from the target I took them down to about 200ft so that the radar at nearby Agedabia airfield would not pick us up. As the formation lost altitude one of my pilots, a Canadian, flew straight into the ground. Whether he was hit by ground fire or it was an error of judgement, we shall never know, but I had lost a fine aggressive operator and the crash resulted in a huge fire and an oil-smoke plume visible for many miles. We had little time to worry about this as the coast and the road we were to attack was already in view.

As we approached the Agedabia-Benghazi road, with the coast in the distance we turned on our gunsights and placed the firing button on the control column to fire. The formation started to fly a more erratic course to put off enemy gunners. This was the moment when one forgot fear and an exhilarating sense of total commitment took over. The harder you attacked now the less chance there was of being shot down. We approached the road at right angles and only pulling up at the last moment to get a sight on a target. There were targets in profusion because the Afrika Korps tanks and vehicles were nose to tail and some in 'lagger' brewing up. We picked on batches of vehicles and soon we had explosions going and a large number of fires. It is never wise to go back and attack a target a second time unless it is absolutely necessary, so I indicated a turn to the north where further soft-skinned vehicles could be seen in large numbers. Again our attack brought fires and explosions. Unfortunately the Afrika Korps were beginning to wake up and anti-aircraft fire, particularly heavy machine gun fire, was crisscrossing our course with the occasional burst of lazy-looking red tracer. It was about that time that I lost another aircraft but in the heat of the action I did not see exactly what happened. I had exhausted my cannon ammunition and imagined that others in the formation were in much the same situation so I made a right turn back into the desert calling the flight on R/T as all surprise had now been lost. The important thing was that the enemy did not monitor our radio transmissions thus discovering where we had come from so it was silence again after that first call.

As we left the target, and the excitement of action subsided the problem that was very much in my mind, as leader of the formation, was how I was going to find LG 125. To get there we had to cross 200 miles or so of featureless desert with no sort of navigational aid. We were at fairly low level lest the enemy radar got some idea of the location of our desert base. So it had to be the watch and the compass. On this occasion it was helped by a clear day and patch of a most white sand which was the only real feature close to our landing ground. The whole sortie had taken two hours. The other flight had also lost an aircraft to ground fire so we were already three aircraft down.

The evening was spent digging in and briefing for the following day's operations. I slept in the cockpit of my aircraft, not the most relaxing couch, and I woke several times during the night. By dawn I was stiff and uncomfortable. However, the operation had not been designed for comfort. Next day the plan was to attack Agedabia airfield which was known to be pretty active. Again the operation was to be undertaken in separate flights. After a typical desert breakfast of soya sausages and beans (which several of those troubled by nervous stomachs could not face) we were off again and heading west.

The flight to the target was uneventful. As we approached I ordered my flight down to low level and into a loose formation designed



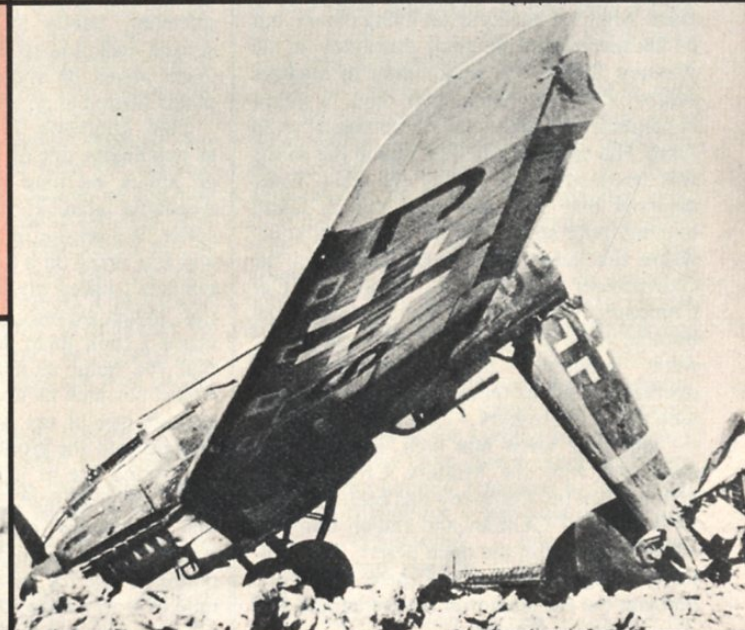
Top: Hudsons of No 117 Squadron which conveyed personnel and supplies for No 243 Wing to LG125 in November 1942.

Above: Iron Maiden. RAF armoured cars in the desert, 1942.

Above right: LG125 scene, November 1942, as Hudsons of No 117 Squadron unload supplies.

Right: Bent bird. Heinkel He111 at Catania airfield.

Below: Junkers Ju87D-1 Trop, ex-S7+LL of 33/St G3, 'liberated' and repainted in fresh markings by No 213 Squadron.



to give maximum manoeuvrability for strafing attacks. Locating the airfield was made simpler by sighting an Italian SM82 transport aircraft which was circling it. I detached two aircraft to deal with it hoping it was full of generals. There were several Italian CR42s parked on the strip. We swept across them with cannon fire and then turned our attention to the airfield installations. It was a successful attack and we claimed the poor SM82 and the CR42s as destroyed. The light anti-aircraft fire from emplacements surrounding the airfield had been quite intense and one of my aircraft had been shot down. It was with some sense of relief that I headed the flight back to the desert. It was to be an eventful journey. As one of my wingmen came abreast of me I could see that his port long range tank was on fire. What should I advise him to do? He was leaving a long trail of smoke across the sky. The danger was that the fire would reach the main fuel system and the aircraft would explode. I was about to tell him to make a speedy forced landing in the desert and hope to be picked up, when the problem was solved for me. An explosion in the burning tank blew it off the aircraft's wing. I did not know what damage this might have done, but the pilot was a calm Australian and I felt that he should risk carrying on as he was, as we were, by now, over some pretty inhospitable desert.

Our troubles had only just started. The sky was by now overcast and the desert had taken on a grey colour. Again I tried my best dead-reckoning navigation but this time, when my watch told me that we should be in sight of the landing ground, there was no sign. Certainly the white sand dune was not showing up against the grey of the desert. There was nothing for it but a square search in the hope that one of us would pick up the strip. But it was not to be, and with considerable self-condemnation concerning my navigational technique, and anxious glances at the fuel gauges, I decided that our only chance was to bear north in the hope of running into the British 8th Army which I knew to be advancing fairly rapidly in the direction of Benghazi.

The aircraft that had been on fire seemed to be under control, so we set off north. I hoped to strike the coast at or near Tobruk, but had we enough fuel? We climbed in order to have better visibility and conserve fuel. We pulled back our engine revolutions and put our fuel control into weak, only clearing the engines occasionally to stop rough running. Unhappily our course took us over a substantial element of the retreating Afrika Korps though because of the dust haze we were unaware of this until it was too late. Luckily there were no enemy fighters in the air. Had there been, we would have been sitting targets as no one in my flight had any ammunition left.

The whole sortie to Agedabia airfield should have taken about two hours but we had now been in the air for over four hours. Things were getting pretty desperate. A landing in the desert and possible capture were very much on the cards. Then, through the haze in the distance, I saw the coast appear. The remaining questions were

whether we could make it on the fuel we had left and, if we did, whether we could find a landing ground in allied hands. Luckily the answer to both was yes. We struggled to Gambut airfield which had just fallen to the Allies. All pilots landed safely, although the aircraft which had been on fire was a write-off.

At dawn next morning, after some sleep and refuelling, I set off with my remaining aircraft to try and find LG 125. I was a little apprehensive about what sort of reception I would get and felt that my navigation might come in for some criticism because my squadron CO, leading the other six aircraft, had been due to attack the same target a few minutes after us. Once more we headed behind the German lines, although this time I took care to steer well clear of the Afrika Korps. It was a clear morning and this time my navigation put me right on to the strip. We landed without further incident.

To our surprise we learned that the CO and his flight had also failed to return. As far as the ground crew were concerned the whole of the squadron had been lost and near total catastrophe had struck the operation. Our return brightened the situation somewhat.

I had a pretty good idea that the CO had got into the same sort of trouble that had affected my navigation and that he and his flight were down in the desert somewhere. We refuelled our aircraft and set off to search for the other flight and with a stroke of inspiration took along with us two stirrup pumps.

We spent about an hour searching likely areas for a forced landing when we spotted Vercy lights being fired. We found five Hurricanes (one having been shot down over the target) which had apparently landed in the desert with wheels down and were in reasonable order. They wasted no time in marking out a safe landing strip for us. By skilful and energetic use of the stirrup pump we transferred fuel from our long-range tanks into their empty main tanks. The aircraft batteries were all in good shape and 20 minutes later the whole circus was back at LG 125. What had at first looked like a total catastrophe for the squadron had been to a large extent retrieved.

During our adventures in the desert the other squadron, which had not been on the airfield attack, had been briefed to make further attacks on the Benghazi-Agedabia road. On their way to their target they spotted an Italian armoured column of about 50 vehicles some 60 miles from our strip. The column had obviously been sent to winkle us out of our secret landing-ground. Our security was blown. The squadron abandoned their sortie and got stuck into the column, destroying all the vehicles.

The column was now no longer a threat, but chancing on it had been a great stroke of luck. Given a few hours and the Italians might have made a terrible mess of our whole operation. We had to accept that they had sent out a wireless warning. We spent a restless and vigilant night, on guard against another possible attack, as other columns might have been in the vicinity. Time was clearly running out for us.

On the next day, the fourth behind German lines, the morning's task was to attack the airfield at Galo which was being used by both the Germans and Italians. It was situated just outside an oasis of the same name. It was a flight of about one hour almost due south into the desert without even a coast line to help us judge our target position. However, on this occasion, the navigation was good and we found and attacked a very surprised airstrip indeed. There were few aircraft on the strip, but a lot of transport and many swiftly scattering troops. It was possibly the HQ of an enemy long range desert group. Ground fire on this occasion was not intense and we had no losses. We had achieved good surprise.

After the previous navigational experience the journey back was made at a higher level, with the aircraft spread well out to give maximum desert coverage. The day was clear and on the hour the welcome white sand dune was in sight. We were soon on the ground.

During our absence two Hudsons had appeared with orders for us to pull out before our strip came under air attack itself or we were attacked from the ground. As soon as refuelling was complete we were off and a two-hour flight brought us back to our slightly more established desert base and the comforts of a shave and a camp bed in a dusty, sand tent. Even now we had to forego a bath, because of the shortage of water.

Our squadron had lost five aircraft with their pilots during the operation. Three of them in fact survived to become prisoners of war. No 2 Armoured Car Company was left to make its own way back to more friendly territory. This they did by disappearing into the desert and flanking the southern elements of the German Army. They had done a great job and their redoubtable commander's reputation as a real desert hawk was further enhanced, but he also had a fine team.

There has been much retrospective discussion amongst military historians about whether Montgomery harassed the Afrika Korps sufficiently during their retreat. Certainly the Desert Air Force played their full part and though our operation was but a small part of the overall air assault it was an important one and a worrying one for the enemy. Our squadron took 14 aircraft on the operation and lost five with one hopelessly damaged. Three pilots prisoners of war. I don't know what Rommel thought about it all but I think he would have been worried about his flank and the knowledge that relatively short range fighters were already operating against his rear areas. It was a good plan of psychological and operational effectiveness. Some fighter formation leaders learnt a thing or two about desert navigation!

Yes, as Wilfred Thesiger wrote of the desert, 'No man can live this life and emerge unchanged'. The squadrons that operated from LG 125 would agree — wholeheartedly.

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IN THE words of a recent magazine headline — 'happiness is . . . an Airbus A310!' This is certainly the case with Swissair which by the end of August 1983 had taken delivery of three out of its fleet of 10 A310s. The fourth was scheduled to enter service in mid-November, and four of the

initial batch were the launch order for the A310-300, an extended range version with extra fuel in the fin and will be used by Swissair for its Middle Eastern and West African routes. The airline holds a further 10 A310 options. The reason for converting the latter part of the initial order to the longer range version, was an expected over-capacity on European routes at the time the early version of the A310 was to be available, and also the opportunity to put the aircraft on the longer routes.

With three aircraft in the fleet, two normally operate the Zürich-based routes, and a third the flights from Geneva. The fourth aircraft will increase the Zürich fleet. The A310s do not directly replace any existing

Swissair aircraft, although the last of the DC-8s are now being phased out. The A310s operate on routes served by the DC-9 Super 81s where extra capacity is required and have averaged a 59% load factor in the three months up to the end of August. Busy routes such as Zürich to London tend to be almost always full, but the overall load factor is reduced by some of the thinner routes which are still developing from DC-9 capacity to the more attractive wide-bodied comfort of the Airbus. In addition to passengers, the Airbus is able to carry what Swissair calls 'a good payload' of freight. Nearly seven tons can be carried on a fully-booked passenger flight using standard cargo containers compatible with DC-10s and Boeing 747s. The three aircraft fleet has been

is the advanced instrument panel in which the traditional electromechanical instruments are replaced by small cathode ray tubes (CRT) with conventional instrument back-up. Six CRTs are in front of the pilots, two paired one above the other directly in front, one on either side of the central engine instruments and two below these on the central console.

The top two CRTs display the flight director information to the pilots giving aircraft attitude, airspeed and approach data. The two navigation CRTs below show radio navigation data, projected flight paths with DME information, and when required a colour weather and topographical radar display can be superimposed. The two CRTs on either side of the engine controls, which are in mono, are part of the computerised

Electronic Centralized Aircraft Monitor (ECAM) which automatically monitors and reports on aircraft systems. Either automatically, or on demand by the crew, these CRTs display systems diagram and parameters, plus routine and warning messages, procedures and operating limitations. Examples are the layout of the three hydraulic systems, so that should one fail, the power can be maintained by the remainder. When calling up the undercarriage status, the brake temperatures and tyre pressures are all displayed, an alert being indicated if anything is abnormal. An example might be that following an autoland with auto braking when the long period of friction on light braking could cause a brake temperature to rise a few degrees over the limit. Not only is this shown up on the chart, but will come up as an alert signifying 'no go' until the temperature is normal. On arrival at the finger dock, the situation on the access doors is displayed to ensure that the escape chutes are unarmed on any exits likely to be opened.

The remaining two CRTs are used for the Inertial Navigation System (INS) display, check list or standby. All CRTs are in six full colours on black background and provide a high level of brilliance even in direct sunlight, except for the ECAM system. The check list display appears automatically at the correct phase of operation, and each action is shown in blue, until cancelled when it goes white. Alerts, depending on importance or urgency are shown in yellow, orange or red.

To cover operation of the first three aircraft, approximately 35 pilots have been trained, although the normal is to have seven to nine crew available per aircraft. All the initial training has been completed at Aero Information at Toulouse up to Category III autoland standard using the simulator. Despite the sophistication of modern simulators, some training is still carried out on the actual aircraft. The initial courses at

Toulouse were up to 10 weeks, but these are gradually reducing as Swissair takes over more of its own training. The airline will take delivery of its A310 simulator at Zürich in early 1984.

A dramatic feature of the A310 is its very quiet operation, reducing noise nuisance and pollution from the airports where it flies. This is not only important for the airline, but also for the airports, in particular for Zürich where future expansion is expected which requires the agreement of the local population. The A310 is the quietest commercial aircraft operating at the moment from Zürich, its noise footprint being about one fifth of the soon to retire DC-8 srs 62s. Toxic emission and smoke from the aircraft's Pratt & Whitney engines are very much lower than from earlier noisy jet engines.

The noise levels of the A310 are in fact 10 dB (A) less than the DC-8 srs 62, and when measuring a range of airliners taking off over a short period at Zürich, the noisiest was a Swissair DC-9 srs 51 at 98 dB (A), and the quietest the A310 at 84 dB (A) with about 80% of its full load. Bearing in mind that noise measurement is on a logarithmic scale, the reduction is considerable.

Swissair is part of the KSSU Group covering the maintenance of its aircraft and engines. The Group, as the initials suggest, consists of KLM, Swissair, SAS and UTA. In the past, with a wider range of common aircraft equipping these airlines, it was a valuable organisation, but with the A310, only KLM shares the aircraft, and although SAS still operates the A300, the aircraft are up for disposal. Swissair is responsible for the maintenance of the Pratt & Whitney JT9 engines for itself and KLM.

To help maintain its tight schedule, the A310 fleet, having flown some 2,000 hours and carried over 105,000 passengers by the end of August, is equipped for Category IIIA automatic landings. This allows the aircraft to land in bad weather with a decision



swissairairbus update

Philip J. Birtles reports from Zürich on the first six months of A310 service with Swissair, thus providing an update to the 'A310 arrival' feature that appeared in the July issue

averaging 6.3 hours per day per Airbus and despatch reliability is up to 99%, having been 97% for the first three months. There is probably no other new aircraft approaching this level of regularity so early in its service life.

The first Swissair A310 entered service on 21 April 1983 on an ad hoc basis, with the full service beginning on 26 April from Zürich to London, Frankfurt and Paris, all on a daily basis. With the arrival of a further aircraft, Athens, Istanbul and Lisbon were added to the Zürich schedule. The Geneva-based aircraft serves London, Frankfurt and Paris, also daily. The fourth aircraft will allow Zürich-Tel Aviv to be added to the



Above: On the flightdeck of Swissair A310 HB-IPC en-route to London. The CRTs in front of the First Officer are visible with the navigation information below the flight director. The air conditioning status is shown on the main panel and fuel prediction on the centre console. Altitude is 27,460ft and indicated air speed 290kts.
Photo: Philip J. Birtles

Below: The eight abreast seating of the economy section in the A310 passenger cabin.
Photo: Airbus Industrie

schedules. The sixth to ninth aircraft will be the A310-300 mid-range version, which Swissair intends to route to the Gulf, Dakar and Abidjan.

A choice of two passenger cabins are provided by Swissair with 22 seats in First Class and 190 seats in Swiss Class. The cabin configuration is six abreast seating in First Class and eight abreast in Swiss Class with two aisles throughout, giving the passenger no further than one seat access to the aisle. The A300 and the A310 features the unique upward sloping cabin floor towards the rear. In a recent passenger survey, the first class passengers were 100% satisfied, and the Swiss Class 92%. The Airbus certainly comes out as the most popular aircraft in the Swissair fleet, not only with the passengers, but also with the flightcrews. The A310 is operated by a crew of two — Captain and First Officer. A third seat is fitted, where the flight engineer would be on another aircraft, for a check captain, instructor or technician monitoring the performance of the systems. A fourth seat is situated behind the captain. The view from the flightdeck is superb and everything is within easy reach of the pilots. The most unfamiliar feature of the flightdeck

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Top: One of the first Airbus A310s to join the Swissair fleet photographed during a pre-delivery test flight and carrying the French registration F-WZLH. Photo: Airbus Industrie

Above: Initial A310 assembly at Toulouse was mixed with A300s but in due course separate lines will be set up. Behind the Swissair A310 fin is airframe number 261 destined for Eastern Airlines. Photo: Airbus Industrie



Below: Swissair A310 HB-IPB *Neuchatel* on the finger dock at Zürich having loaded with baggage and freight. The Captain has just completed his walk round inspection ready for departure. The A310 has large underfloor baggage and freight holds which accommodate all the standard size containers. Photo: Philip J. Birtles



Right: Swissair A310 still in its French test markings (F-WZLL) operating from Zürich Airport. The aircraft is currently the quietest jet operating from the airport — and many others! Photo: Airbus Industrie



Below right: A close-up of the Pratt & Whitney JT-9D turbofan fitted to the A310. The wing leading-edge devices include a small Kruger flap near the wing root to improve lift during take-off and landing. Photo: Swissair

height of 6m (20ft) and a runway visual range (RVR) of 200m (600ft). The A310, like the A300 previously, is fitted with British Aerospace designed, developed and built wings. Their supercritical shape give a high level of efficiency, the wing being smaller, thicker and lighter than on the A300. This wing, with its special double curvature, which is most pronounced at the trailing edge, close to the wing root, results in a considerable fuel saving, especially compared with efficiency of earlier aircraft types.

The first Airbus A310 made its maiden flight from Toulouse on 3 April 1982 and was to the Swissair standard with Pratt & Whitney engines. It carried the livery of Swissair on the starboard side and Lufthansa on the port, commemorating the two launch customers. Total A310 sales were 108 by the end July 1983 with a total of 12 aircraft delivered to Swissair, Lufthansa and KLM. A further 13 airlines have placed orders for the A310. Comparable figures for the Airbus A300 were 244 sales and 213 delivered, the

sales figures not including the options which take the total to over 400. Many of the improvements developed for the A310 have now been incorporated in the basic A300 airframe, which is now known as the A300-600. This version first flew from Toulouse on 8 July 1983, and will soon replace the earlier A300 series aircraft on the production line.

The Airbus programme is therefore a highly successful European industrial programme.



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RNZAF

the flying Kiwis

Part 1: History and Training

In this first article of a four-part survey on the Royal New Zealand Air Force, Greg Meggs provides an historical background to the service and also looks at the training of its pilots and navigators.

THE early development of military aviation in New Zealand owes much to the persistence of one Henry Wigram, who from 1916 endeavoured to interest the NZ Government in the establishment of flying schools, which he considered essential for the country's future defence. To aid his case, Wigram purchased a site at Sockburn on the outskirts of Christchurch and three Caudron aircraft, and in September 1916 established Canterbury Aviation Co Ltd. During WW1 the company trained a total of 182 pilots, many of whom saw action in Europe and the Middle East. The company's training efforts wound down at the end of the war, but not so Henry Wigram's tenacity. His persistence was rewarded when he finally convinced the Government to assume control of Sockburn, and on 21 June 1923 the field, aircraft, and buildings became Government property. Several days later the aerodrome was renamed Wigram, to honour its founder's efforts.

A few days earlier, on 14 June, the New Zealand Permanent Air Force and New Zealand Air Force (Territorial) were formed as part of the Army. Equipment consisted of several Imperial Gift aircraft which had been retained by the Government instead of being handed over to various civilian concerns, as had been the case with most of the 33 aircraft received. In the mid-1920s, land was purchased at Auckland for the establishment of a land and seaplane base, which opened in 1929 as Hobsonville. The title of Royal New Zealand Air Force (RNZAF) was bestowed on 27 February 1934, replacing NZPAF, although it remained as part of the Army.

With the international situation looking bleak in the mid-1930s, expansion of the RNZAF was implemented. Orders were placed in the UK for Wellingtons, Oxfords, and many older ex-RAF and FAA aircraft, expansion of the existing sites at Wigram and Hobsonville begun, and work started on two new air bases, Ohakea and Whenuapai. When the RNZAF became a separate

service on 1 April 1937, it had on charge only 29 aircraft. The 18 ordered Wellingtons were accepted by the RNZAF during 1939, but were transferred to the RAF before the war started. During this expansionary period four Territorial Squadrons were formed, numbered 1, 2, 3 and 4.

Empire Air Training Scheme commitments expanded the RNZAF's aircraft strength considerably from 1940, and by the war's end around 12,000 aircrew had been trained in New Zealand under this scheme. However, when the war spread to the Pacific region in December 1941, the RNZAF was virtually without any modern aircraft with which to defend itself. This situation was remedied with the arrival of large numbers of Hudsons, Kittyhawks, and later on Venturas, Dakotas, Avengers, Dauntless, Catalinas, and Corsairs. At its peak, the RNZAF had on strength over 1,300 aircraft, 27 Pacific based squadrons, and over 41,000 service men and women.

Postwar brought about reduction and reorganisation of the air force as future requirements were assessed and implemented. By the early-1950s the four Territorial Squadrons, assimilated into the regular Air Force during the war and subsequently disbanded, were reformed to fly initially Harvards, and later Mustangs. The RNZAF's first jets, de Havilland Vampires, were introduced in 1951 and gradually older types made way for the new, with the wartime American preference replaced by a British one. By the end of the decade, in addition to the various marks of Vampires,

there were Canberras, Bristol Freighters, Devons, and Hastings in RNZAF service. During this period the RNZAF was frequently involved in British Commonwealth peace keeping efforts, from Cyprus through to South East Asia. It was the latter region and the South West Pacific that New Zealand foreign policy began to favour in the late-1950s and through the 1960s, policies which continue to this day.

Replacement of the first generation jets and other types during the 1960s and 1970s saw the influence shift back to the US with Hercules, Orions, Sioux, Iroquois and Skyhawks purchased.

The RNZAF of the early-1980s is a small but efficient service, consisting of seven operational and three training squadrons equipped with just under 100 aircraft. Currently under way are mid-life updates for many of the aircraft in the inventory and in the pipeline are possible replacements for the Skyhawks and Sioux, dependent on budgetary allocations.

Pilot Training Squadron

RNZAF Base Wigram is the site of RNZAF Support Group Headquarters, and also the majority of the Air Force's training commitments. Flying units on base, as part of Flying Training Wing, include the Pilot Training Squadron with the CT-4B Air-

Below: A picturesque photograph taken in 1975 of Harvard III, NZ1076 of the Pilot Training Squadron (PTS). Photo: RNZAF

trainer, the Navigation and Air Electronics Training Squadron with F-27 Mk 100 Friendships, and the Central Flying School which operates several Sioux, Airtourers, and the Airtrainers as required.

Wigram airfield is perhaps one of the better flying training locations in New Zealand. Extending many miles inland and along the coast are the Canterbury Plains, which are flat yet have many interesting geographical features. The military training area extends over these plains southwards from Wigram and beyond the coast to the south-east. Wigram itself retains a vintage appearance, with hangars and other buildings of the mid-1930s, and in common with that era, most flying is off the grass.

Pilot training revolves around a 16 month course which is divided into four phases of roughly 15 weeks each. Three courses start each year; in January, May, and August, with an average of 13 students per course — ten RNZAF, one RNZNavy, one Army, and maybe one Military Assistance Programme student.

Initial phase for budding pilots is the Command Training School, which in 15 weeks is tasked with turning young civilians into military officers, with a knowledge of the service and its expectations of them, an ability to assert authority, make sound decisions, and of course march around the parade ground. The final six weeks at CTS includes an introduction to aviation-related subjects, which must be a big relief and a signal that the best is yet to come!

The first flying phase at the Pilot Training Squadron (PTS) is the Primary Phase with 55 flight hours to acquaint the students with the aircraft, and covers basic handling, navigation, radios, emergency procedures, and instrument flight. Interspersed with the flying are, of course, ground studies which occupy half of each day's programme. One course will fly mornings one week, afternoons the next, alternating with the preceding or following course. Should the weather close in for any length of time, especially during the primary phase when a good visual horizon is desirable, ground lectures may get too far ahead of the practical application, and when the weather clears additional flying periods may be scheduled in the evenings in order to catch up.

At the end of the Primary Phase, the students take a well earned week's leave,

Colour centrespread, overleaf

Left: The impressive scenery of the Canterbury Plains in New Zealand provides the backdrop for CT-4B Airtrainer, NZ1942, of the Pilot Training Squadron. Student pilots amass a total of 130 flying hours at the PTS prior to moving on to . . .

Right . . . the Strikemasters of No 14 Squadron for advance fast jet training. The squadron is stationed at RNZAF Ohakea, where No 14 shares the apron with the Skyhawks of the service's front-line unit, No 57 Squadron. Note the No 14 Squadron badge on the air intakes of these two Strikemasters, NZ6376 (nearest) and NZ6364. Photos: Greg Meggs



Left, top to bottom:

One of many US types that entered RNZAF service in WW2 was the Corsair, as represented by this F4U-1, NZ5410. Corsairs were not assigned to individual squadrons but were on the charge of various servicing units, to be distributed as required.

Another US type in WW2 that was assigned to RNZAF servicing units rather than squadrons was the PV-1 Ventura, this example being NZ4558. At its WW2 peak, the RNZAF had on strength over 1,300 aircraft and 27 Pacific-based squadrons.

By the early-1950s the four Territorial Squadrons, assimilated into the regular RNZAF in WW2, were reformed to fly initially Harvards and later Mustangs, such as these rocket-carrying P-51Ds.

The RNZAF's preference for US aircraft was switched to British types by the late-1950s, including the de Havilland Vampire that became the service's first jet. Although the two aircraft pictured are FB5s of No 75 Squadron, they feature an FB9-standard air conditioning housing at the engine intake. Photos: RNZAF



which allows them time for reflection and recuperation. Thereafter starts the Basic Phase with 75 hours of more demanding flying, with the aircraft taken to the limits of the flight envelope. For instrument flying the Airtrainer is equipped with a comprehensive avionics fit, including VOR/ILS, DME, and ADF. In fact virtually all of the instrument work is taught at PTS on the Airtrainer, and the students then only need to consolidate what they have learnt at a later stage on the Strikemasters. The use of the Airtrainer for this work, and in fact the high ratio of piston-to-jet time scheduled for the wings course, results in quite considerable financial savings

without any apparent drop in the final standard achieved by the trainee pilots.

Navigation exercises (Nav-Ex) are of course a prominent part of the flying training syllabus. After four local Nav-Exs during the Basic Phase, all trainee pilots participate in several of the 'Wise Owl' exercises, which involves from five to eight aircraft flying to any one of the many provincial airports throughout New Zealand where the students and instructors will set up camp for four to five days. From their central location the students will fly several dual and then solo navigation sorties, while at the same time being introduced to mountain and valley

flying among what must rank as some of the finest scenery anywhere. In addition to the flying exercises, 'Wise Owl' is also used to test the character of the students who must participate in camp life and generally prove their ability to get along with their peers. 'Wise Owl' furthermore gives the New Zealand public the opportunity to view the air force at work, and much local interest is generally evident.

Prior to moving on to No 14 Squadron for the Advanced Phase of training, the students will have flown 130 hours at PTS, and this large amount on a limited performance aircraft does introduce at least one small problem. This is in regard to attitude flying and the importance of precision in all aspects of flight, something which is at times easy to overlook in the low performance Airtrainer. Whereas in this aircraft a heading a few degrees either side of intended track or nose too high or too low will not immediately or to any significant degree alter the position of the aircraft, once flying begins in the Strikemaster a few seconds' inattention to attitude can result in marked changes of position or height. To counter this, the instructors at PTS occasionally fly in the Strikemasters to keep them aware of the problem so that they can then pass the knowledge on to their students while instructing.

At No 14 Squadron the students fly 85 hours on the Strikemaster, where they learn more advanced aspects of aircraft operation. At the completion of the course, the successful students return to Wigram for their graduation parade and to receive their hard earned 'Wings' brevet.

The instructors at PTS come from all manner of service flying positions, from helicopters to strike, and transport to maritime. Perhaps typical was the author's guide while visiting the PTS, Flt Lt John McWilliam. John joined the RNZAF in 1975, and along with 18 other students trained on Harvards in Wigram, clocking up 140 hours before moving to Strikemasters at Ohakea. Here John added another 100 hours to his total, before graduating in November 1976. In early 1977 he began a three month Sioux helicopter basic course at Wigram, eventually flying 60 hours on type before posting to No 3 Squadron in April 1977 for an Iroquois operational conversion. During August of that year John began a six month stint back at Wigram as part of No 3 Squadron's SAR detachment. The tedium was relieved by a three week tour with VXE-6 at McMurdo Base, Antarctica, flying as co-pilot in a UH-1N.

In March 1978 he started two years service in Singapore with the RNZAF Support Unit, providing logistic support for the New Zealand Army Battalion stationed there. In March 1980, John returned to Hobsonville Airfield where he stayed until January 1981, at which time he was chosen to be the *Aide de Campe* to the Governor General. His selection for this post was, according to John, influenced by their mutual interest in golf. This posting lasted until May 1982, when John returned to Wigram to undertake an instructor's course at the Central Flying School. His PTS time began early in 1983, and should last for two

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years before, hopefully, going back to No 3 Squadron which John is looking forward to as he considers helicopters to be the most independent flying the air force can offer.

Helicopter training in the RNZAF is under the auspices of the CFS, even though it is a distraction from its main role of maintaining flying standards and instructor rating. Actually the job of helicopter training does not fit comfortably with PTS either, because although it is ab initio training for Army aviators who leave the main stream prior to the Strikemaster, air force and navy pilots already have their wings and for them helicopter training is a post graduate course. For convenience alone this task is with the CFS for the time being.

In addition to the Airtrainers, Wigram also houses several Airtourers, which is a predecessor of the CT-4. The Airtourers entered service in 1970, and were initially employed to train Army pilots when PTS was still flying Harvards. Now it is considered more viable to put the Army men through with the standard stream and today the Airtourers are used by the CFS for flight grading, air experience and general flying.

Navigator and Air Electronics Training Squadron

In addition to the PTS and CFS, Wigram is also the home of the Navigator and Air Electronics Training Squadron (NATS), which is responsible for training all the RNZAF's navigators and air electronics operators as well as ground telecommunications personnel. After graduation the navigators will serve in either the Andovers, Boeing 727s, C-130s, or P-3s, while the air electronics operators will man the various sensors in the P-3s.

An average of six students begin each navigator course, which spans 12 months in three week phases. Initially a small amount of introductory flying is done with the CFS in the Airtourer, for air experience and lead-in to map and instrument reading. Thereafter up to 180 hours are flown in the NATS, three F-27 Mk 100 Friendships, which have been specially modified for the training role with navigation consoles for two students and a monitoring instructor.

Air electronics operators during their 24 week course are given basic instruction on radios, radar and all related systems in the F-27s prior to posting over to No 5 Squadron for operational training on the equipment they will use as part of an Orion crew.

Five crews, comprising pilot, co-pilot, and navigator, are on the staff at NATS and they average around 35 hours a month in the air. In addition to flying, pilots spend time on Air New Zealand's F-27 simulator at Auckland International Airport, where such procedures as engine-out landings are practiced, as well as other flight conditions which are not advisable in the real machine for safety sake.

Roughly 40% of flying time scheduled for the F-27s is devoted to navigator and air electronics training; other tasks include communications flying, VIP and SAR work. For these various roles the aircraft retain 20 of their original seats in the rear of the cabin.

DECEMBER 1983



Above: RNZAF F-27 Mk 100, NZ2783, of the Navigator and Air Electronics Training Squadron (NATS) which is stationed at Wigram. Photo: Greg Meggs

As part of the updating on the three F-27s after receipt from Air New Zealand, their cockpits were brought up to roughly Mk 500 standards with doppler and omega navigation systems, 938 litre underwing fuel tanks were added, and side bulged observation windows installed. These are all important additions for another role falling to the NATS Friendships — an interesting one as it is under the control of Operational Group rather than Support Group — that of maritime patrols (Mar Ops) over the southern portion of New Zealand's 200 mile EEZ. Generally four flights are fielded each month, naturally at no fixed time or route throughout a particular area.

For the Mar Ops, the normal crew is supplemented with radio and radar operators. Although the radar currently used is only the aircraft's standard weather radar, an experienced operator can obtain quite good results as was demonstrated during a Mar Op on which the author flew. Briefing was scheduled for 07.00hrs on the morning of 18 May — close to the middle of winter in the southern hemisphere. Cold, wet, and windy was how the day started, and the sun's appearance on the horizon shortly after 07.00hrs could do nothing to ease the gloom. The weather briefing forecast low cloud and strong winds for the entire route, which would take the patrol roughly 200 miles east of Wigram, before heading south until roughly abreast of Dunedin, and then back to Wigram via the coast.

Piloting the aircraft (NZ2783, 'Kiwi 958') was Flg Off Peter Lyell with Flg Off Tim Lang in the right hand seat. By 08.00hrs we had lined up on Wigram's sole paved runway, and after final checks were away, climbing through 2,000ft at 150kts on a heading of 070°. Just eight minutes after take-off the radar operator had the first contact, 'on the nose, 30 miles'. Nearing the vessel, descent commenced to 350ft, and as the F-27 flew alongside, the ship was identified as a Russian tug boat, which was presumed to be a support vessel for the expected fishing fleet. Photos were taken before the

patrol resumed at 3,000ft, heading 100°. By 08.15hrs 'Kiwi 958' was 40 miles out from Wigram, and just 10mins later the radar operator called 'target on nose, 20 miles'. Flg Off Lyell immediately descended to 2,000ft to clear clouds and at 08.30hrs continued down at 500ft per minute to 500ft above the waves. As the F-27 swept past the new vessel its registration was confirmed as 'JCCQ', which was identified as a Russian trawler, although it was heading north and not fishing.

At 08.52hrs came the message 'target at 30 miles, close to edge of EEZ, turn aircraft to heading of 085° to intercept'. With the cloud base at 1,500ft we began the descent through the drizzle to firstly 500ft feet and then 300ft. While investigating the third vessel, which also turned out to be a Russian trawler, a new contact was established, 'another south, head 150°, target at 15 miles'. From the cockpit this could be seen visually at 13 miles as the weather momentarily lifted. During the next 35min the patrol contacted and investigated a further six ships in the general area, all trawlers heading north and making a rough passage through the 20ft swells.

The flight continued on southwest until the way point east of Dunedin, and, having surveyed the planned patrol area by radar and thus confirming and absence of shipping, the patrol cut short by 20 odd miles and positioned off the coast for the return to Wigram. On this last leg only one further sighting was made, which turned out to be a freighter.

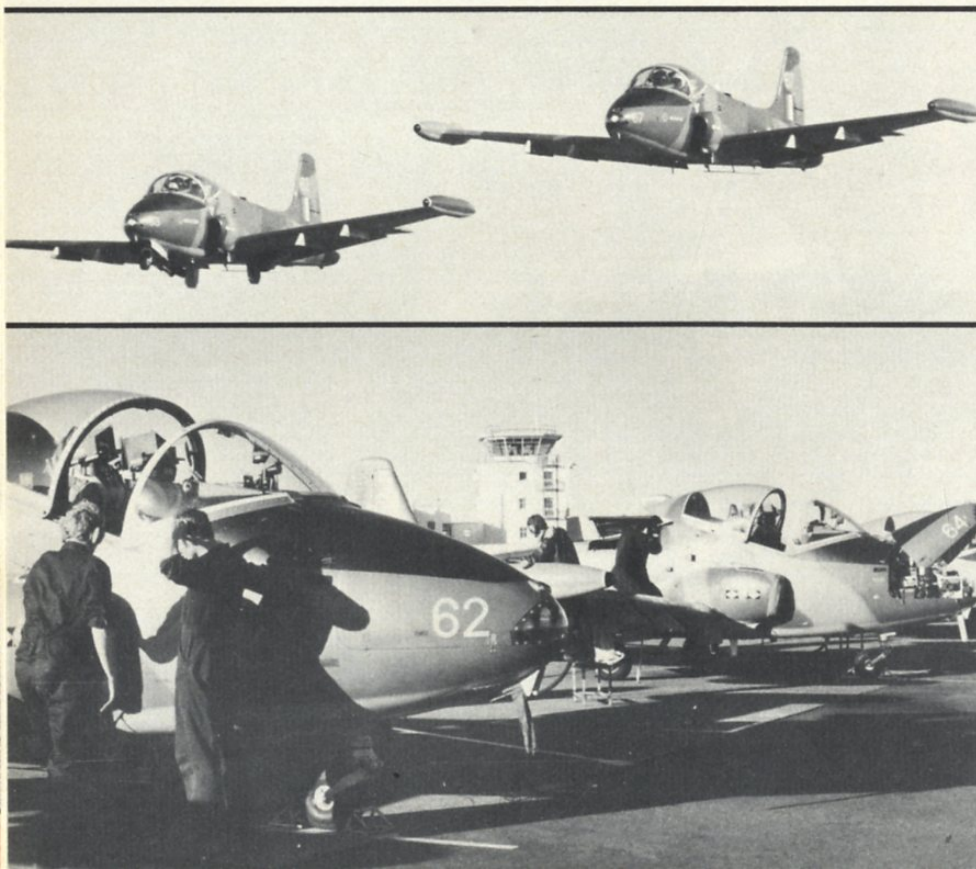
By 11.50hrs the crew was back on the ground at Wigram, where the rain was still falling and the wind blowing as hard as before departure. In nearly four hours the flight had plotted 10 ships, none of which was engaged in activities which required further action. This is the usual result of Mar Op flights, as infringements of fishing rights are rare; Russian and Japanese vessels have established a very good reputation, though Korean and Taiwanese are more lax. Fines for illegal fishing can be very high, as during the author's tour of New Zealand, a Taiwanese captain appeared in court, having been detected fishing 17 miles inside the EEZ by a RNZAF P-3 Orion. Upon conviction he was fined \$7,500 and ordered to pay \$86,000 towards the cost of seizure of his vessel by the Royal New Zealand Navy.

555

Above: A line-up of RNZAF CT-4B Airtrainers on the apron at Wigram, prior to the beginning of the day's flying activities.

Below: Two Strikemasters depart Ohakea for ACM instruction.

Bottom: Maintenance being carried out on the Strikemasters of No 14 Squadron at Ohakea. Photos: Greg Meggs





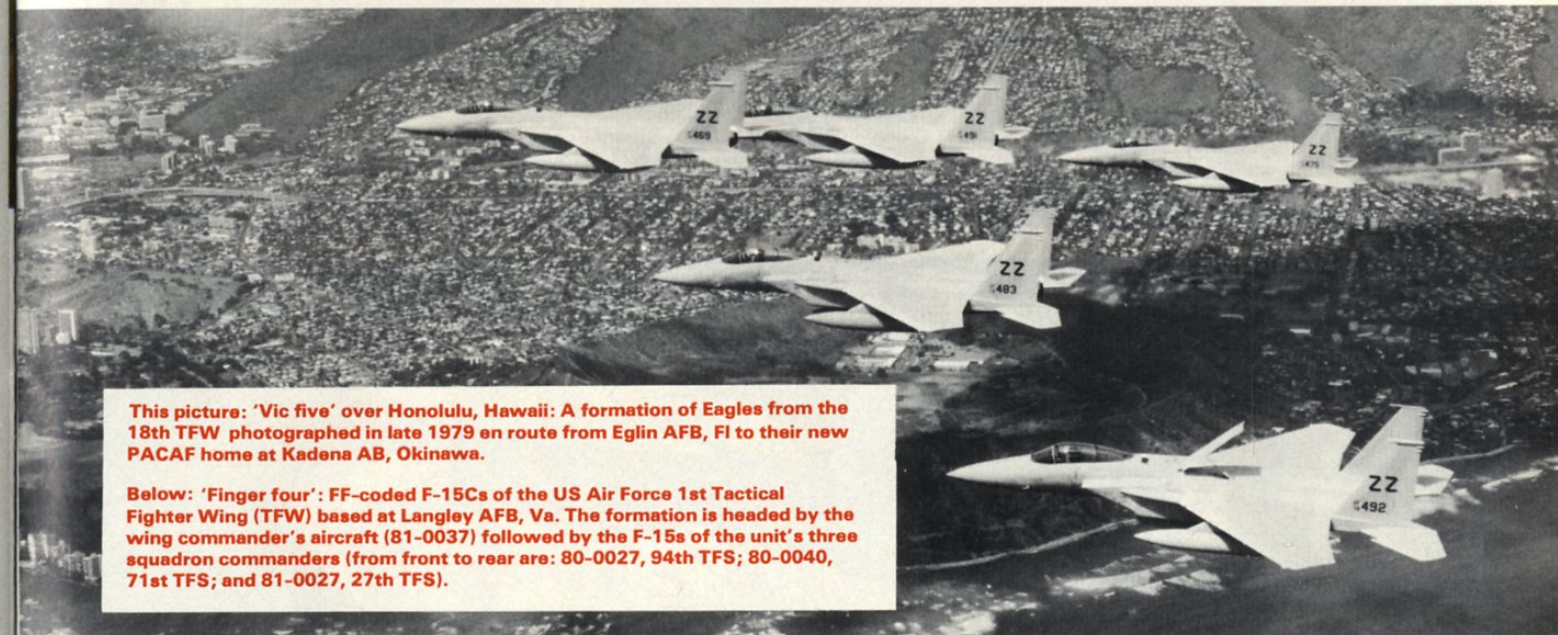
FORMATING EAGLES



Photographs by McDonnell Douglas

Far left: The US Air Force and McDonnell Douglas have recently been flight testing an F-15 modification that will extend the aircraft's operating radius with large external weapons loads by up to 40%, depending on its configuration. Termed 'Tangential Carriage', the modification makes use of stub pylons attached to the F-15's FAST pack conformal fuel tanks on which can be fitted up to 12 1,000lb bombs (as seen here) or four 2,000lb bombs. For mission payloads of many weapons, the stub pylons replace conventional multiple racks; the latter cause more drag and use external fuel stations, both of which limit the aircraft's range. The modified aircraft, 78-0468 (the first F-15C incidentally) completed the trials at the US Air Force Flight Test Center at Edwards AFB Ca.

Left: 'Three echelon' bank to starboard: Three F-15Cs of Bitburg-based 36th TFW, USAF over a featureless cloudscape.



This picture: 'Vic five' over Honolulu, Hawaii: A formation of Eagles from the 18th TFW photographed in late 1979 en route from Eglin AFB, Fl to their new PACAF home at Kadena AB, Okinawa.

Below: 'Finger four': FF-coded F-15Cs of the US Air Force 1st Tactical Fighter Wing (TFW) based at Langley AFB, Va. The formation is headed by the wing commander's aircraft (81-0037) followed by the F-15s of the unit's three squadron commanders (from front to rear are: 80-0027, 94th TFS; 80-0040, 71st TFS; and 81-0027, 27th TFS).



Above: 'Vic five' over Honolulu, Hawaii: A formation of Eagles from the 18th TFW photographed in late 1979 en route from Eglin AFB, Fl to their new PACAF home at Kadena AB, Okinawa.

Right: 'Four echelon': a formation of Israeli AF F-15 Eagles over the historic mountain fortress of Masada.



HENDON's Bomber Command Museum will shortly receive another aircraft exhibit, an authentic replica of what can justly claim to have been Britain's first successful bomber. Don Cashmore's Sopwith Tabloid replica, representing RNAS Tabloid No 168, will provide an appropriate lead-in to the aircraft collection and a striking contrast with the larger and infinitely more potent machines of later years.

Designed as a high performance racer, the Tabloid emerged in mid-November 1913 as a single-bay biplane with moderately staggered mainplanes of deep chord and equal span, utilising wing warping for lateral control. No vertical fin was fitted, the rudder being of the aerodynamically-balanced 'comma-form' type; the wheeled undercarriage was augmented by extended wooden skids, and power was provided by the popular 80hp Gnome seven-cylinder rotary engine, enclosed within a wedge-shaped cowl. The prototype was ostensibly a two-seater, accommodating pilot and passenger side-by-side in the small cockpit, but this seems a somewhat optimistic claim unless both were of below-average stature.

The Tabloid possessed obvious military potential, and the prototype was subjected to War Office appraisal at Farnborough on 29 November 1913. Despite carrying a passenger and fuel for 2½ hours the Tabloid, flown by Harry Hawker, demonstrated a level flight speed range of 37-92mph and an

initial climb rate of 1,200ft/min — that such performance was extracted from a fully loaded aircraft with only 80hp available is clear indication of the supremacy of Sopwith's design and engineering methods. The impressive speed and climb rate were accompanied by remarkable agility and manoeuvrability, though some criticism was made of the control and instrument layout. A major drawback was the lack of a trailing edge cut-out in the upper mainplane, but one was incorporated to improve the field of vision on all future Tabloids. The War Office was apparently satisfied, and on 18 December it ordered nine single-seat examples for the Military Wing of the Royal Flying Corps, increasing the order quantity to 12 the following March. These were intended for fast scouting and dispatch carrying duties, no more ambitious role being generally envisaged for military aircraft at that time.

One RFC production Tabloid was temporarily diverted by Sopwiths and converted to seaplane configuration. Fitted with a small triangular fin and plain rudder, a feature incorporated on all future Tabloids, and powered by a 100hp Gnome Monosoupape, this aircraft was flown by Howard Pixton in the 1914 Schneider Trophy contest in Monaco. Pixton won the contest convincingly on 20 April, completing

Below: A starboard side view of '168', showing the main features of the Sopwith Tabloid. The type's appearance and performance aroused much comment in 1913-14.
All photos by R. A. Nicholls

the 150nm course at an average speed of 86.8mph, then flew two additional laps during which he established a new world speed record for seaplanes of 92mph. Returning to the UK, the Tabloid was restored to standard format for delivery to the RFC.

Delivery of RFC Tabloids to Farnborough began on 22 April 1914, on which day No 378 arrived dramatically, turning over and sustaining damage when it landed on rough ground. No 378 subsequently underwent destructive testing at the Royal Aircraft Factory, and a modified and strengthened undercarriage was specified for all future Tabloids. The first delivery of a Tabloid to an RFC unit was on 30 June 1914 when No 381 was flown from Farnborough to Netheravon, apparently for issue to No 3 Squadron. The twelfth and final RFC Tabloid was delivered to Farnborough on 4 August 1914, the day on which Britain declared war on Germany and became embroiled in the bloody conflict which was to engulf Europe for the next four years.

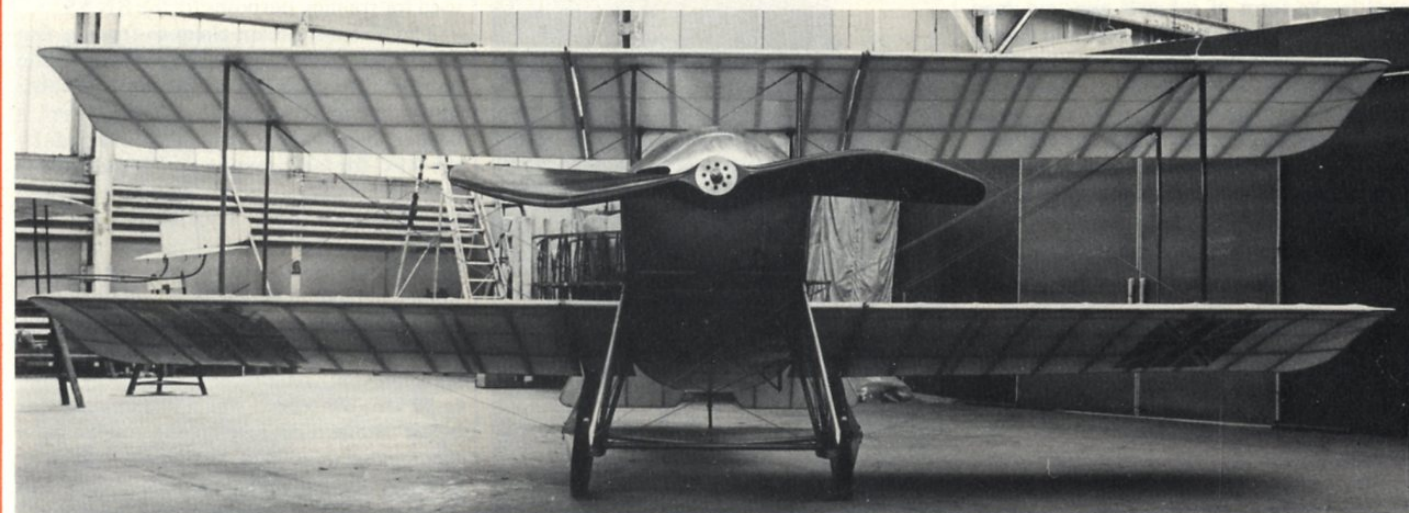
No Tabloids went to the Continent with operational units of the RFC, but four were crated and shipped to the Aircraft Park which was established at Boulogne, arriving 18 August 1914. These were Nos 362, 386, 387 and 611, and some if not all were flown in action by 2/Lts Norman Spratt and Gordon Bell, two of the four flying officers attached to the Aircraft Park. It is not known for certain which Tabloid Spratt was flying on 28 August, when he forced a German Albatros to land in Allied territory by circling above it and making as if to

attack, but records suggest that his mount was either No 362 or No 386 — Nos 387 and 611 had both been issued to No 3 Squadron, RFC, at Le Cateau on 24 August, only to be written-off on 2 and 3 September respectively.

In common with other contemporary aircraft the Tabloid was unarmed, Spratt and his colleagues relying primarily on their revolvers. This officer is also known to have taken aloft a supply of 'flèches', sharpened steel darts for dropping on an adversary, and toyed with the idea of trailing a grenade on a length of wire with the object of fouling an opponent's propeller. With aerial combat in its infancy there was much scope for individual initiative and innovation! The RFC soon concluded that the Tabloid was of

limited military value and no further orders were placed, but the RNAS showed a keen interest and ordered a total of 16. All 16 were delivered between October 1914 and June 1915, some of the later examples having ailerons to replace wing warping.

Below: In head-on aspect the broad chord of the mainplanes, necessary for wing warping, is seen to advantage. Wing span is 25ft 6in, with a wing area of 241.3sq ft. Note national insignia of the underside of the lower mainplanes. The Union Flag was officially introduced on RNAS aircraft on 26 October 1914, though some machines had been so identified earlier as a safeguard against attack by 'friendly' forces. It was superseded by roundels at the end of 1914.

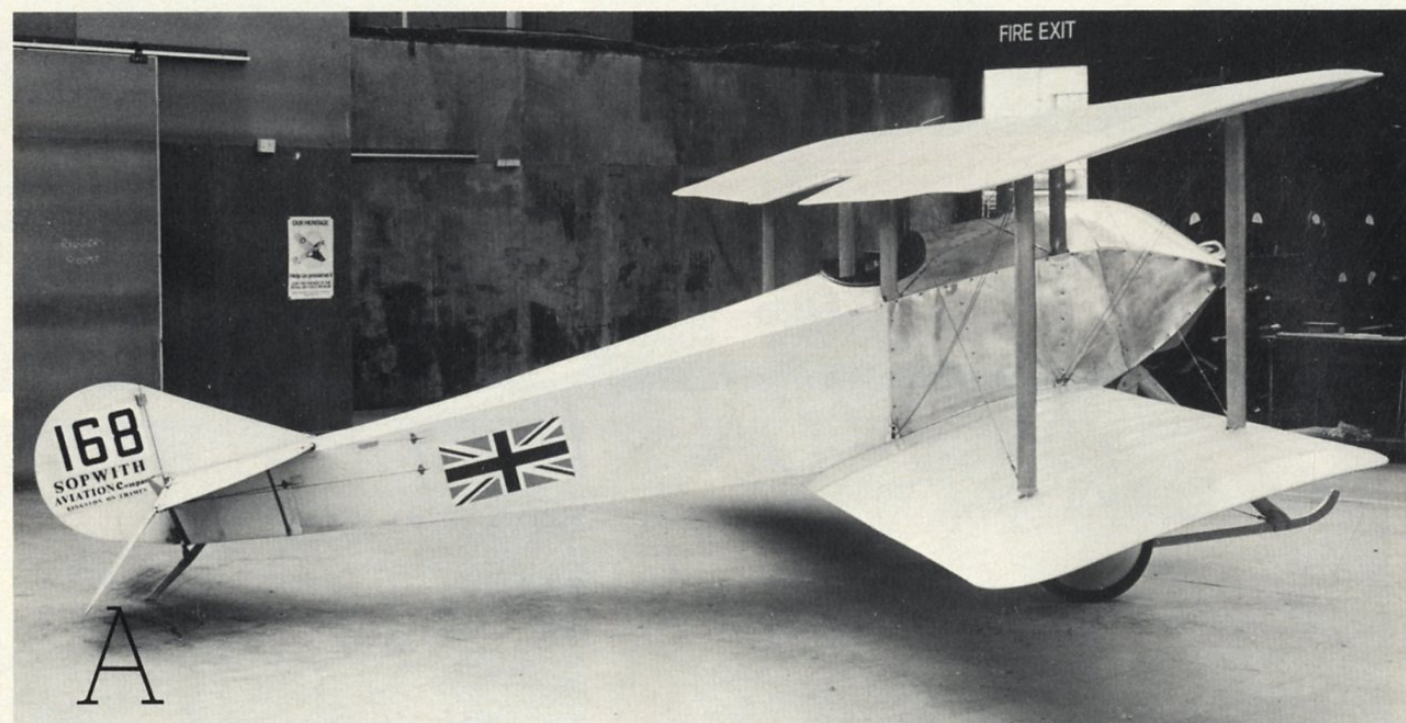


ber 1914 three Tabloids, Nos 394, 395 and 604, had been transferred to the RNAS, where they were allocated serials 167-169 respectively in the naval sequence. All three joined the Eastchurch Squadron and went into action.

On 23 September Tabloid No 169 joined the Churchill, a BE2a, and a Sopwith three-seat Tractor Biplane in an abortive raid on the Cologne and Düsseldorf Zeppelin sheds. Three aircraft got hopelessly lost and returned to Antwerp, where an empty space was found on the Churchill's 'pipe-rack' bomb carrier, one bomb having apparently vibrated off in flight. The crew spent several anxious hours wondering on which side of the lines it had fallen, but they probably worried needlessly; the one aircraft that reached its target dropped three 20lb Hales bombs and all three failed to explode.

The same targets were to receive another visit from the Eastchurch Squadron on 8 October 1914 when Sq Cdr Spenser Grey and Flt Lt R. L. G. Marix, flying Tabloids Nos 167 and 168, took-off from base, each aircraft carrying two 20lb Hales bombs. At Cologne, Grey was unable to locate the target owing to mist and low cloud; descending over the city he came under heavy fire, which he endured for 10min before dropping

Left: The unusual but neat cowl of the 80hp Gnome can be seen to advantage in this view, as can the undercarriage arrangement. Some Tabloids had fabric wheel discs, while others had aluminium as shown on '168'.



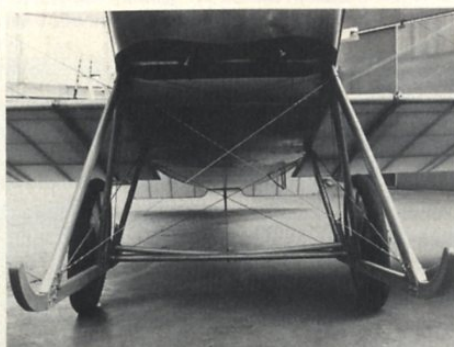
TABLOID FOR HENDON

his bombs on the main railway station, which was reportedly crowded with troop trains en route to the front. Marix had better luck at Dusseldorf and dived towards the target, releasing his bombs from a height of 600ft and scoring direct hits with both. Within a minute flames were leaping 500ft into the air and the new German army Zeppelin Z IX was destroyed, the first Zeppelin to fall victim to a British aircraft. Running short of fuel, Marix was forced to land 20 miles short of Antwerp and complete his journey by bicycle and car, but the Tabloid had secured its place in aviation history and it is Marix's No 168 which is commemorated in the replica.

In February 1915 the Eastchurch Squadron's Tabloids received fixed armament in the form of a Lewis gun, mounted centrally on the upper mainplane and angled upwards so as to fire over the propeller. This was before the introduction of interrupter gears, but in April 1915 RNAS Tabloid No 1214 sported a Lewis gun on the starboard fuselage side, firing forwards through a deflector propeller — the propeller blades

carried steel wedges at the points which aligned with the gun, and bullets which would otherwise have struck the propeller were thus harmlessly deflected.

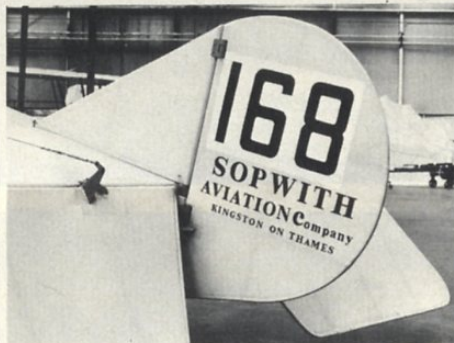
One further Tabloid saw RNAS service, this being an aerodynamically refined and modified machine which had been built as a contender for the 1914 Gordon Bennett Aviation Cup. Alternatively titled the Sopwith Gordon Bennett, this aircraft was powered by an 80hp Gnome and had unstaggered mainplanes; maximum speed was reputedly 105mph. In the event the Gordon Bennett never raced but was either bought or impressed for the RNAS, serving at Hendon as No 1215.



Above right: Undercarriage detail view, typically Sopwith, showing centre-pivoted split axle and cross-bracing wires between the undercarriage struts. Note the translucence of the clear-doped linen fabric covering.

Right: The Tabloid prototype's 'comma-form' rudder was soon replaced by this small triangular fin and plain rudder. The serial number is presented in black on a white ground, and the manufacturers' details are in black.

Below: The diminutive Tabloid, 20ft 4in long overall, weighed 730lb empty and 1,120lb loaded. '168' has been prepared for exhibition by the RAF Museum's Restoration & Storage Centre.

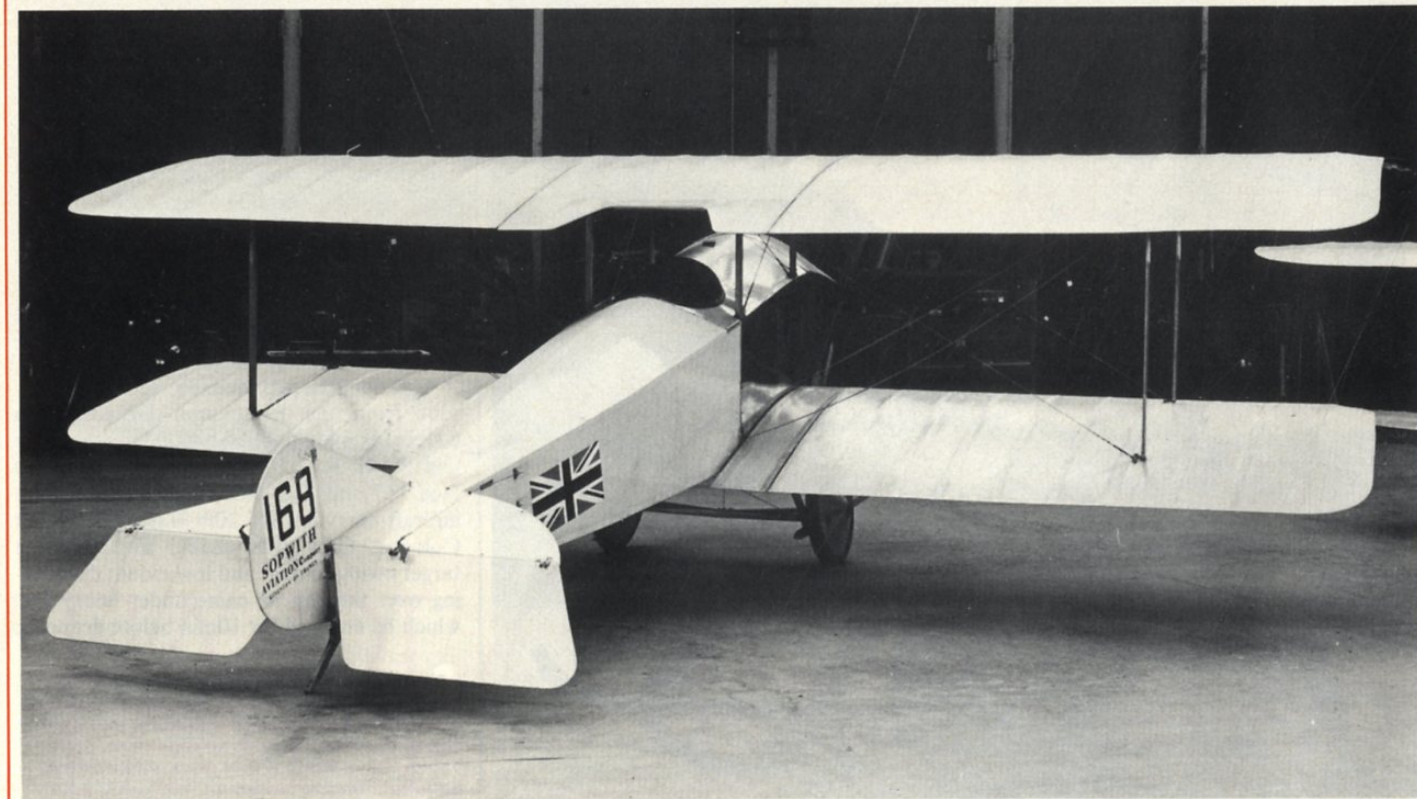


Tabloid production appears to have totalled only 30 examples, including the Gordon Bennett and Churchill, and with the exception of the episodes related above it achieved little military success. More extensive use was made by the RNAS of the Sopwith Schneider, a seaplane version of the Tabloid, which differed little from the 1914 Schneider Trophy winner. The Schneider, 136 examples of which were built by Sopwiths, served in most theatres from mid-1915 and was refined into the more powerful but essentially similar Sopwith Baby and Fairey Hamble Baby seaplanes, production of which ran to 286 and 106 machines respectively. A further 74 examples of the latter were built as landplanes under the name Parnall Hamble Baby Convert and used for training purposes by the RNAS.

The Tabloid's main claim to fame is that of having been Britain's first successful bomber, based on the events of 8 October 1914, but in retrospect the Tabloid had a deeper significance. Originally ordered by the RFC for fast scouting duties, the Tabloid may be considered as having paved the way for Sopwith's Pup, Triplane, Camel and Snipe, superlative scouts which provided stalwart service to the Allied cause during the second half of World War 1.

The Tabloid replica was constructed with the aid of original drawings, and shows a high degree of authenticity. Registered G-BFDE, the replica was flown at a number of air shows and meetings, powered by a Continental piston engine and fitted with ailerons, before being purchased by the Trustees of the RAF Museum. Preparatory to being put on display the aircraft has been modified to wing warping configuration and fitted with an 80hp Gnome engine and contemporary propeller.

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CN-235 roll out

Brian Walters reports from Spain on the roll-out of the new CASA/Nurtanio CN-235

IN ceremonies held simultaneously in Spain and Indonesia, the first two prototypes of the CN-235 were rolled out on 10 September. The first fruits of a collaboration between CASA and Nurtanio, the CN-235 joins the Saab-Fairchild SF 340, de Havilland Dash 8 and Embraer Brasilia in a tough battle for orders from regional airlines.

Stimulated by de-regulation in the United States and a steady world-wide growth in short range air transport routes, the 30/40-seat airliner category is witnessing a healthy demand. Nevertheless, competition for orders will be strong indeed as the manufacturers seek to recoup the heavy investment necessary for the development of new designs.

Encouraged by the good relationship built up during the licensed manufacture of the C-212 transport aircraft by Nurtanio in Indonesia, CASA decided in 1979 to propose the joint development of a new airliner. The two companies formed Airtech with headquarters in Madrid and agreed to a 50/50 workshare on the new project. Investment too is shared on an equal basis and \$80 million has been spent so far on the development of the new airliner.

Of the 106 firm sales and 23 options held so far, 50 are for military operators and a 60% market share for the military version is anticipated. In the period to the end of 1995, civil CN-235 sales are expected to reach 1,800 — and estimated 20% of the market. Break even figure for the CN-235 programme is 300; eventual sales in Indonesia alone are expected to exceed this total.

Although CASA and Nurtanio are separated by over 8,000 miles, 'single source' production lines are to be established in both Spain and Indonesia, with large components being air freighted between Getafe and Bandung. Both scheduled and charter carriers have been used so far but the Belfast and CL-44 aircraft of HeavyLift are likely to carry out the bulk of the transport between the two plants.

Although the CN-235 has, like its competitors, a pressurised fuselage, the design is unusual in having a rear door and ramp which facilitates its use as a cargo transport. The sturdy undercarriage retracts into sponsons and the CN-235 will be able to operate from grass or dirt strips. It is likely that a maritime reconnaissance version will be developed (the Indonesian Navy has ordered 18) and the design lends itself to a variety of roles.

Left: Some of the aircraft built or maintained by CASA formed a 'guard of honour' for guests arriving for the CN-235 roll-out ceremony.



Top: In the colours of Prinair and Aviaco, the first prototype of the CN-235 was recently rolled-out at CASA's Getafe plant. All photos by the author

Above left: Single slotted flaps and a relatively high aspect ratio wing will give the CN-235 a good short field performance.

Above right: Sponsons house the tandem wheels of the main undercarriage and the high wing is set well above the pressurised fuselage.



Compiled by A. J. Wright

THE Luton-based airline Nightflight is now using the first Beech 99 to appear in the UK. This example previously served with Trans Michigan Airlines, Great Lakes Airlines and Cascade Airways. British Midland continues to expand its DC-9 fleet as a result of new route approvals. The latest is another machine from Finnair, the previous source of supply. A couple of years or so ago, BMA reserved the mark G-BMAW for one of several Friendships expected to join the airline. At the time it was not taken up, but this month the aircraft from Air Tanzania is trying again. A similar type is to operate with Jersey European. The airline has acquired two from TAT, the first of which, F-GCMR, has now been registered. Its companion will be F-GCMA and is due in January. Shortly after this, British Caledonian will be taking delivery of its first A310. In preparation two receive their allocations in this batch.

Registration	Type	C/n	Owner or operator
G-BKSS	Jodel D150A	48	D. H. Wilson-Spratt (F-BMFC)
G-BKUY	BAe Jetstream 31 02	616	McAlpine Aviation Ltd
G-BKWS	EMB-110P1 Bandeirante	261	Olsencrest Ltd (G-CTLN)
G-BKWT	Airbus A310-203	295	British Caledonian Airways Ltd
G-BKWU	Airbus A310-203	306	British Caledonian Airways Ltd
G-BKWV	Colt 105A balloon	521	Lighter-Than-Air Ltd
G-BKWW	Cameron 0-77 balloon	984	A. M. Marten
G-BKXC	Cameron V-77 balloon	973	P. Sarretti
G-BKXD	SA365N Dauphin	6088	Management Aviation Ltd
G-BKXE	SA365N Dauphin	6090	Management Aviation Ltd
G-BKXH	Robinson R-22	128	March Helicopters Ltd
G-BKXX	Cameron V-65 balloon	1000	P. G. Dunnington
G-BMAI	Douglas DC-9-14	45713	British Midland Airways Ltd (OH-LYA/N13614/CF-TLD)
G-BMAW	F-27 Friendship 200	10212	British Midland Airways Ltd (5H-MRH/5H-AAC/5Y-ACC/VP-KSB/PH-FEB)

Registration	Type	C/n	Owner or operator
G-EZEE	Rutan VariEze	1737	M. G. E. Hutton (F-PYKJ)
G-IACL	BN-2T Islander	2138	Pilatus BN Ltd (G-BJYS)
G-JRSY	F-27 Friendship 200	10324	Jersey European Airways Ltd (F-GCMR/00-PSF/I-ATIL)
G-KASH	AA-5 Traveler	0083	Karen Peters Knitware Ltd (G-AZUG)
G-MJTO	Duet srs 1	D101	Jordan Aviation Ltd
G-MJWB	Eurowing Goldwing	EW-59	A. R. Slee
G-MJWC	Skyhook HS525A Trike	201	O. W. Neumark
G-MJWI	Flexiform Striker	RWT-01	R. W. Twamley
G-MJXF	MBA Tiger Cub 440	EJH-01	E. J. Hadley
G-MJXK	Skyrider Airsports Phantom	MGS-01	M. G. Selley
G-MJXL	MBA Super Tiger Cub	5029	M. J. Lister
G-MJXN	American Aerolights Eagle	PL/9	C. H. Middleton
G-MJXO	Middleton CM5	5	C. H. Middleton
G-MJXR	Huntair Pathfinder II	133	Huntair Ltd
G-MJXS	Huntair Pathfinder II	134	Huntair Ltd
G-MJXT	Phoenix Falcon I	0001	Phoenix Aircraft Co
G-MJXU	MBA Tiger Cub 440	SO-166	Radio West Ltd
G-MJXW	Southdown Sigma	CJT-01	C. J. Tansley
G-MJXX	Flexiform Striker	AAL-01	Airbourne Aviation Ltd
G-MJXY	Hiway Demon Skytrike	KQ17D	C. Russell
G-MJYZ	Hiway Demon	RPF-01	R. P. Franks
G-MJYB	Eurowing Goldwing	030	D. A. Farnworth
G-MJYD	MBA Tiger Cub 440	SO-179	M. L. Smith
G-MJYE	Southdown Lightning Trike	GP-02	G. Poplewell
G-MJYG	Skyhook Orion Carnard	SKC-01	Skyhook Sailwings Ltd
G-MJYH	Skyhook 3 Axis Prototype	SKM-01	Skyhook Sailwings Ltd
G-MJYI	Mainair Tri-Flyer	MJJ-01	M. J. Johnson
G-MJYJ	MBA Tiger Cub 440	SO-177	M. F. Collett
G-MJYK	Noble Hardman Snowbird	SB-001	Noble Hardman Aviation Ltd
G-MJYL	Airwave Nimrod	165271AN	R. Bull
G-MJYN	Mainair Tri-Flyer 440	165-13683	Mainair Sports Ltd
G-MJYO	Mainair Tri-Flyer 330	166-13683	Mainair Sports Ltd
G-MJYP	Mainair Tri-Flyer 440	167-13683	Mainair Sports Ltd
G-MJYU	Mainair Tri-Flyer	170-16583	R. Clegg
G-MJYW	Wasp Gryphon III	2/330/PM	P. D. Lawrence
G-MJYX	Mainair Tri-Flyer	108-251182	R. K. Birlison
G-MJYY	Hiway Demon 330	ZD17D	N. H. Martin
G-MJYZ	Flexiform Striker	1/330/PM	R. W. Ashton
G-MJZA	MBA Tiger Cub	SO-45	C. R. Barsby
G-MJZB	Flexiform Striker Dual	PC-141	P. Cunningham
G-MJZC	MBA Tiger Cub 440	SO-169	P. G. Walton
G-MJZE	MBA Tiger Cub 440	SO-168	D. Ridley & ptnrs
G-MJZF	La Mouette Atlas 16	01	W. R. Crew
G-MJZG	Mainair Tri-Flyer 440	164	G. J. Foard
G-MJZH	Southdown Lightning 195	BFC-01	B. F. Crick
G-MJZI	Eurowing Goldwing	EW-84JS	A. J. Sharpe
G-MJZJ	Hiway Outlass Skytrike	GDHS-01	G. D. H. Sandlin
G-MJZL	Eipper Quicksilver MXII	EEW-01	E. E. White

Registration	Type	C/n	Owner or operator
G-MJZM	MBA Tiger Cub	SO-35	F. M. Ward
G-MJZN	Pterodactyl	CJB-01	C. J. Blundell
G-MJZO	Flexiform Striker	1/330/PM/683	B. H. Ness
G-MJZP	MBA Tiger Cub 440	HCB-01	Herts & Cambs Biplanes Ltd
G-MJZR	Eurowing Zephyr 1	EW2-201	Eurowing Ltd
G-MJZS	MMT Scorpion	1	C. Mowat
G-MJZT	Mainair Trike	JDR-01	M. Hurtle
G-MJZU	Micro 5	DL-2	D. M. Livesey
G-MJZW	Eipper Quicksilver MXII	1037	W. Smith & ptnrs
G-MJZX	Hummer TX	TX-16	K. T. G. Smith
G-MJZY	Gold Marque Shadow	0001	P. W. Fathens
G-MJZZ	Skyhook Cutlass	H440	J. Bradbury & D. F. Coles
G-MMAG	MBA Tiger Cub 440	SO-47	W. R. Tull
G-MMAH	Eipper Quicksilver MXII	TM1016	T. E. McDonald
G-MMAI	Dragon 150	0032	Blois Aviation Ltd
G-MMAV	American Aerolights Eagle	AV-01	Aeri-Visual Ltd
G-MMAW	Mainair Rapier	131-10283	T. Green
G-MMAZ	Southdown Puma Sprint	MABP-01	M. A. P. Bull
G-MMBA	Hiway Super Scorpion 250	REL65/CII	P. Dook
G-MMBB	Hiway Super Scorpion 330	276832	A. T. Grain
G-MMBE	MBA Tiger Cub 440	SO-74	R. J. B. Jordan & R. W. Pearce
G-MMBF	American Aerolights Eagle	NVM-01	N. V. Middleton
G-MMBG	Chargus Cyclone	21-V5	P. N. Long
G-MMBH	MBA Super Tiger Cub 440	SO-37	C. H. Jennings & J. F. Howseman
G-MMBJ	Solar Wings Typhoon	RFB-01	R. F. Barber
G-MMBK	American Aerolights Eagle	2480	B. M. Quinn
G-MMBL	Southdown Puma	80-00083	A. J. M. Berry
G-MMBM	La Mouette Azure 125	78273/81	A. Christian
G-MMBN	Eurowing Goldwing	EW-89	J. E. Andrew
G-MMBR	Hiway Demon 175	SSMT-01	S. S. M. Turner
G-MMBS	Flexiform Striker	JTRC-01	J. Tate & R. Collinson
G-MMBT	MBA Tiger Cub 440	SO-131	G. M. & C. M. Booth
G-MMBU	Eipper Quicksilver MXII	CAL-222	C. Crawford
G-MMBV	Huntair Pathfinder	044	M. P. Phillippe
G-MMBW	MBA Tiger Cub 440	SO-134	J. C. Miles
G-MMBX	MBA Tiger Cub 440	SO-151	Fox Brothers Blackpool Ltd
G-MMBY	Ultrasports 440 Trike	T483759XL	Solar Wings Ltd
G-MMBZ	Solar Wings Typhoon P	T98152-17	D. S. Raymond
G-MMCA	Solar Wings Storm	21WB	P. B. Curnell
G-MMCB	Huntair Pathfinder	136	Horizon Aerosails
G-MMCD	Southdown Lightning DS	14018383	Microlight Services
G-MMCG	Eipper Quicksilver MX1	10990	Microlight Airport Services Ltd
G-MMCH	Southdown Lightning Phase II	82-00263	R. S. Andrew
G-MMCK	Stewkie Aer-O-Ship LTA	ST001/LTA	K. Stewart
G-MMCL	Stewkie Aer-O-Ship HAA	ST002/HAA	K. Stewart
G-MMCM	Southdown Puma Sprint	CM-2	C. Montgomery
G-MMCN	Solar Wings Storm	SMB8069	A. P. S. Presland
G-MMCO	Southdown Sprint	RP015	R. J. O. Walker
G-MMCP	Southdown Lightning II	JDH-01	J. D. Haslam
G-MMCT	Eipper Quicksilver MX	CA92069	T. L. & B. L. Holland
G-MMCT	Hiway Demon	RGG-01	R. G. Gray
G-MMCU	Dragon 150	D150/051	Dragon Light Aircraft Ltd
G-MMCV	Solar Wings Typhoon III	T583783	S. N. Pugh
G-MMCX	MBA Super Tiger Cub 440	MU-002	D. Harkin
G-MMDA	Mitchell Wing B-10	01	H. F. French
G-MMDM	MBA Tiger Cub 440	DM-01	D. Marsh
G-MMGB	Southdown Puma Sprint	543	G. Breen
G-MMJC	Southdown Sprint 440	2/440/PM/883	J. C. Lloyd
G-MMJD	Southdown Puma Sprint	SP-1001	J. Doswell
G-MMML	Dragon D150	D150/002	J. Doswell
G-MMNL	Dragon 150	42	Air Consultants
G-MMNF	Southdown Puma Sprint	DAC-01	Doncaster Aero Club Ltd
G-MMOF	MBA Tiger Cub 440	SO-76	Sunderland Microlight
G-MOXY	Cessna 441 Conquest	0154	Moxy Dump Trucks Ltd (G-BHLN)
G-NUIT	Beech 99	U-70	Nightflight Ltd (N8013R/N1191C)
G-PLOW	Hughes 269B	670317	March Helicopters Ltd (G-AVUM)
G-RUBB	AA-5B Tiger	0928	Grubb Aviation Ltd (OO-NAS)
G-WMCC	BAe Jetstream 31 02-1	601	Birmingham Executive Airways Ltd (G-TALL)

Compiled by Peter R. March

A FURTHER up-date to *Military Aircraft Markings* listing some additional UK-based aircraft; where an asterisk (*) is shown against a serial number this is a spurious marking, not having been genuinely allocated to that aircraft, although it is carried.

Serial	Type (alternative identity)	Owner, Operator or Location
A4850*	SE5A Replica (BAPC176)	South Yorkshire Aviation Society, Workop
F4650*	SE5A Replica (G-BDWJ/F8010*)	Privately owned, Booker
F5459*	SE5A Replica (G-INNY)	Privately owned, Old Sarum
N6452*	Sopwith Pup Replica (G-BIAU)	Whitehall Theatre of War
T6645	DH Tiger Moth (G-AIIZ)	Privately owned, Redhill
FT239*	NA Harvard IV (G-BIWX)	Privately owned, Stevenage
LB375	Auster 1 (G-AHGW)	Privately owned, Coventry
RF342	Avro Lincoln B2 (G-APRJ, G-29-1)	Privately owned, Blackbushe
WD363	DH Chipmunk T10 (G-BCIH)	Privately owned, Stansted
WG751	WS Dragonfly HR5	Privately owned, Ramsgrave, Lancs
WH863	EE Canberra T17 (8693M)	RAF Marham BDRF
WJ329	HP Hastings C2	RAF Leeming Fire Section
WJ992	EE Canberra T4	MoD(PE) RAE Bedford
WK145	EE Canberra B2	RAE Llanbedr Fire Section
WM366	Gloster Meteor NF13 (4X-FNA)	Second World War APS, Lasham
WP788	DH Chipmunk 22A (G-BCHL)	Privately owned, Sleep
WS863	DH Chipmunk T10 PAX (8360M)	No 1304 Sqn ATC, Chippenham
WS844*	Gloster Meteor NF14 (WS788/7967M)	RAF Leeming, at main gate
WZ416	DH Vampire T11	Lincoln Field Vintage and Historic Aircraft Collection, Bushey
WZ476	DH Vampire T11	Mosquito Aircraft Museum, London Colney
WZ507	DH Vampire T11 (G-VTII)	Privately owned, Cranfield
XF730	Avro Shackleton MR3	RAF Kinloss Fire Section
XL321	Avro Vulcan B2	RAF Catterick, FF&SS
XL583	Hawker Hunter T7	RAF Brawdy for ground instruction
XL846	Westland Whirlwind HAS7 (A2625)	RNAS Lee-on-Solent, BDRF
ZD318	BAe Harrier GR5	MoD(PE)
ZD319	BAe Harrier GR5	MoD(PE)
ZD320	BAe Harrier GR5	MoD(PE)
ZD476	Westland Sea King HC4	MoD(PE) for RN
ZD477	Westland Sea King HC4	MoD(PE) for RN
ZD478	Westland Sea King HC4	MoD(PE) for RN
ZD479	Westland Sea King HC4	MoD(PE) for RN
ZD480	Westland Sea King HC4	MoD(PE) for RN
ZD578	BAe Sea Harrier FRSS1	MoD(PE) for RN
ZD579	BAe Sea Harrier FRSS1	MoD(PE) for RN
ZD580	BAe Sea Harrier FRSS1	MoD(PE) for RN
ZD581	BAe Sea Harrier FRSS1	MoD(PE) for RN
ZD582	BAe Sea Harrier FRSS1	MoD(PE) for RN
ZD607	BAe Sea Harrier FRSS1	MoD(PE) for RN
ZD608	BAe Sea Harrier FRSS1	MoD(PE) for RN
ZD609	BAe Sea Harrier FRSS1	MoD(PE) for RN
ZD610	BAe Sea Harrier FRSS1	MoD(PE) for RN
ZD611	BAe Sea Harrier FRSS1	MoD(PE) for RN
ZD612	BAe Sea Harrier FRSS1	MoD(PE) for RN
ZD613	BAe Sea Harrier FRSS1	MoD(PE) for RN
ZD614	BAe Sea Harrier FRSS1	MoD(PE) for RN
ZD615	BAe Sea Harrier FRSS1	MoD(PE) for RN
ZD625	Westland Sea King HC4	MoD(PE) for RN
ZD626	Westland Sea King HC4	MoD(PE) for RN
ZD627	Westland Sea King HC4	MoD(PE) for RN
ZD630	Westland Sea King HAS5	MoD(PE) for RN
ZD631	Westland Sea King HAS5	MoD(PE) for RN
ZD632	Westland Sea King HAS5	MoD(PE) for RN
ZD633	Westland Sea King HAS5	MoD(PE) for RN
ZD634	Westland Sea King HAS5	MoD(PE) for RN
ZD635	Westland Sea King HAS5	MoD(PE) for RN
ZD636	Westland Sea King HAS5	MoD(PE) for RN
ZD637	Westland Sea King HAS5	MoD(PE) for RN
ZE388	Westland Lynx Mk87 (G-BKBL)	Westland Helicopters

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Above: The Leeds-based Brown Group has replaced a Cessna 421B, G-BCSV, with a Cessna 441 Conquest registered G-MOXY (see this month's column). The aircraft is ex-G-BHLN and is used to commute between Leeds and the Moxy plant at Molde, Northern Norway.
Photo: Colin Addison

airvideo

With the air show season now at an end and the long winter evenings set in, many air enthusiasts will be turning their attention towards the television and video rather than skywards. There is a wealth of aviation material now available on video cassette for home viewing and almost every week something 'new' appears on the lists of the many distributors. Full length feature films dating back to the pre-war years right up to recent releases, historic documentary film, spectacular modern flying sequences and coverage of events from the past few years are all available for hire or purchase from the host of video shops that can now be found on almost every high street. For the next few months **Peter R. March** will be reviewing a selection of these fascinating airvideos which could brighten up your winter evenings.

To begin with this month we take a look at a quartet of documentaries from Thorn EMI Video.

Night Bombers TVE 90 4002 2 (colour 60min)
Directed and photographed by Air Cdre H. I. Cozens CB, AFC, available to readers of Aircraft Illustrated at £18.50

This unique film shot by Air Cdre Cozens while he was station commander at RAF Hemswell in the winter of 1943-44, portrays the build up to a raid on Berlin and the dramatic action of the attack itself. Although many of the sequences in the film, which was shot on a 16mm Bell & Howell clockwork camera using early Kodachrome film, were recreated at the time, the actual raid on Berlin is very much a real one. The quality of the film work is quite outstanding, the take-off sequence of the fully laden bomber being particularly striking, with the cameraman flying alongside the Lancaster (in the station flight's

Oxford), as it struggled into the air. Don't be put off by the rather long lead-in while the planning of the raid at No 1 Group headquarters at Bawtry is screened, the Director is rightly showing the enormous back-up that was needed to get these huge missions off the ground. In fact the important part played by the ground crews, armourers and the many other men and women to get the night bombers out and back again safely is graphically portrayed by Cozens throughout the film.

Spitfire TVE90 0844 2 (colour and b/w 59min)
Written by Brian Johnson, produced by Garry Pownall, available to readers of Aircraft Illustrated at £18.50

In an excellent blend of historic and contemporary film the story of the development of R. J. Mitchell's famous fighter is recalled from the conception of the airframe and its equally famous powerplant, the Rolls-Royce Merlin, to its use as a fighting vehicle during the war. Archive film is used to describe the design and construction features and actual gun camera footage together with animated diagrams are presented to show how it became so successful against the Luftwaffe. The sound track alone is guaranteed to bring back memories to older viewers with the throaty roar of the Merlin and Griffon faithfully reproduced. The video concludes with a colourful film sequence of Ray Hanna flying the Spitfire IX, MH434, as only he can display this veteran fighter, with the viewer given a unique cockpit view of the aerobatics. An excellent tribute to a type which is fast approaching the 50th anniversary of its maiden flight.

The Red Arrows TVF90 1718 2 (colour 25min)
by Arthur Gibson, John Edwards and Norman Peeling; produced by Image in Industry, available to readers of Aircraft Illustrated at £18.50

This video comprises two features shot by Arthur Gibson and colleagues some 12 years apart. The

first is a fairly conventional look at the 1968 'Red Arrows' flying their Gnats from their Kemble base on a pre-season practice. Its conventionality only comes in the contrast with the award-winning Hawks film shot in 1980. This second film was edited from sequences taken throughout the summer air show season, including air-to-air from 'within the team' and from Arthur's well known Piper Aztec, ground to air shots at airfields and seaside resorts around the UK and some exciting cockpit action photography. It is undoubtedly the studio work blending the images and music that makes the 'Red Arrows' Hawks film so memorable.

Lancaster TVE90 0857 2 (colour and b/w 48min)
Written by Brian Johnson, produced by Garry Pownall, available to readers of Aircraft Illustrated at £18.50

If you treasure *Lancaster at War* on your bookshelf then this, the latest video release from Thorn EMI, is essential viewing. The film tells the story of the RAF's greatest bomber from its fortuitous development as the Avro Manchester III right through to the post-war Lancastrian, York and Lincoln. Brian Johnson has succinctly drawn together the facts into a fascinating story which has been well illustrated from archive film, much of which has not been previously on view to the public. Among this film is a sequence showing 'S' Sugar the Lancaster I R5868 going on a wartime bombing mission; this aircraft is now in the Bomber Command Museum at Hendon.

The viewer is taken on a detailed tour of the Lancaster, using PA474 the RAF's last surviving airworthy machine from the 7,377 built. The finale is a flying sequence filmed in colour of PA474 in the air with many of the shots coming from the mid-upper turret and the cockpit. The commentary gives way at this point to a musical background which aptly accompanies these nostalgic pictures.

airbooks

Soviet Helicopters: Design Development and Tactics by John Everett-Heath, published by Jane's Publishing Co (180pp text plus 32pp illus) at £12.95

It was over 50 years ago that the first Soviet rotary-wing aircraft took to the air, and since that time the USSR has placed increasing importance on the helicopter in both military and civil use. Indeed, some idea as to the Soviet's commitment to the helicopter can be gauged by the fact that not only have they built the four largest helicopter types in the world but also have in service the two most heavily armed battlefield helicopters. Against this background, Col John Everett-Heath's survey of the Soviet helicopter makes for impressive reading. It traces the historical development of Soviet rotary-wing aircraft into helicopters such as the highly publicised Mil-24 *Hind* and giant Mil-26 *Halo* and proceeds to discuss their characteristics and employment. Soviet military helicopter tactics have been dealt with in depth and with some authority as the author has himself over 20 years of fixed-wing and helicopter flying. The text is supported by some 80 photographs and line drawings and five appendices provide factual detail.

Airlines of the United States since 1914 by R. E. G. Davies, published by Putnam (760pp illus text incl maps and appendices) at £25

This book first appeared in 1972 and established itself as a standard work upon its subject. The need for a reprint led to consideration of the desirability of revision which was bound to be a costly process and a cause for enhancing an already substantial price. In the upshot a compromise was achieved which seems to be singularly satisfactory. An appendix has been included which summarises the results of the 1978 Deregulation Act, which has had so profound an effect upon the US airline industry, and appropriate additions have been made to the chapters dealing with the local service, freight and charter companies.

An attraction of this work is that it is most readable and very comprehensive. One does not need always to agree with the opinions of the author although, to be fair, he is able to adopt a dispassionate attitude more easily than many US aviation writers. It will be interesting to see in his forthcoming book on the airlines of Latin America how he deals with the Pan American-TACA rivalry when he has more space than the two pages which are available here. Much of the fighting took place in the early 1940s when public attention was more concerned with more martial contests. JFP

Finnair — the art of flying since 1923, by John Wegg, published by Finnair (300pp with 450 illus [100 in colour]) at £18.95

The 60th anniversary of the founding of Aero O/Y which has become Finnair occurred on 1 November 1983 and to mark the occasion the airline has sponsored the production of this book and has indeed printed it in its own department. The book has been written in English — not in American — and has been provided with a commendably large number of maps showing route developments at various stages. It provides also a potted history of commercial aviation develop-

ments in Finland prior to 1923 and there is a chapter dealing with the Karhumäki operations. There is an appendix by R. E. G. Davies which concerns itself with the claim of Finnair to be the sixth oldest airline in the world operating today. This embodies so many qualifications, apart from miscalling Aircraft Transport & Travel, that it serves rather to confuse the issue as indeed does the tabular matter which follows it. Thereafter the appendices which follow and the individual aircraft histories with photographs are admirably clear as are the details of Finnish and foreign airports and periods of use. JFP

Jet Bombers by Michael Taylor, published by Hamlyn (160pp illus text colour throughout) at £6.95

In this follow-up to the publisher's *Jet Fighters*, Michael Taylor traces the gradual development of jet bombers from the earliest German types of WW2 to the highly sophisticated machines of today. In between the author looks at the first generation of Soviet jet bombers (and their German-related ancestry) and leads on to the giant designs of the 1950s and 1960s, featuring aircraft such as the B-36, B-52 and our own Valiant, Victor and Vulcan. Other chapters examine the 'Naval Bomber' and 'Attack' aircraft. It is difficult in a book of this type to deal with any particular bomber in depth, but one feels that aircraft such as the TSR2 and Valkyrie were of significant importance to merit more than one paragraph each; especially in view of the generous photographic coverage afforded to them. For the most part, however, this is a well written and colourful book, although the reviewer has some reservations with regard to the choice and positioning of illustrations.

Aircraft of World War 3 by Anthony Robinson, published by Hamlyn (192pp illus text) at £6.95

The words 'World War 3' give a futuristic connotation to the title of this book, but one soon discovers that perhaps a more accurate title might have been 'Combat Aircraft of Today'. In an informative text, Anthony Robinson looks at the aircraft and equipment currently operated by the major air powers of the world, largely setting the numerical advantage of the East against the so-called technical superiority of the west. All aspects of air and space warfare are examined, including 'Strategic Forces', 'Tactical Combat', 'Air Defence', 'Recece and ELINT' and 'Army Aviation', rounding-up with a chapter on the balance of forces.

At £6.95 the book represents good value for money, but its overall visual impression is marred by poor quality cutaway diagrams that in all honesty would have been best omitted.

United Kingdom Aerodrome Index (CAP481) published by the Civil Aviation Authority (40pp) at £2.00 plus 45p p&p*

This publication is a new venture by the CAA and is based on information held at the Aeronautical Information Service. It lists UK aerodromes, both active and inactive, and gives details of their co-ordinates, elevation and current status. Cross references between alternative names are given and the names are arranged in one alphabetical sequence. The CAA plans to publish the index in March and September each year.

*Available from CAA Printing and Publication Services, Greville House, 37 Gratton Road, Cheltenham, Gloucester GL50 2BN or, to personal callers only, from the Publications Sales Point, Central Library, CAA House, 45-59 Kingsway, London.

airbooks briefing

Airshows 1982: an illustrated review of the year's air events compiled by Susan Bushell and David Sergeant, published by Midland Counties Publications (44pp incl 10pp illus) at £3.95

Ultralight & Microlight Aircraft of the World by Alan-Yves Berger and Norman Burr, published by Haynes Publishing (285pp illus text) at £8.95

American Warplanes WW2-Korea, volume I (Warbirds Illustrated No 15) and American Warplanes WW2-Korea, volume II (Warbirds Illustrated No 16) by Jeffrey L. Ethell, published by Arms and Armour Press (both 64pp colour throughout) at £5.95* each

American Fighters of the 1980s: F-16 and F-18 (Warbirds Illustrated No 17) by Robert C. Stern and **Military Prototypes of the 1950s (Warbirds Illustrated No 18)** by Michael J. H. Taylor, published by Arms & Armour Press (both 68pp illus, incl 4pp colour) at £3.95 each*

B-29 Superfortress: Part 1 — Production Versions (in detail & scale Vol 10) and B-17 Flying Fortress: Part 2 — Derivatives (in detail & scale Vol 11) by Alwyn T. Lloyd, published by Arms & Armour Press (72pp illus text incl 8pp colour) at £4.50 each

Combat Aircraft by Andrew Kershaw, illustrated by Michael Trim, published by Kingfisher Books (125pp illus text) at £1.95

B-29 Superfortress — Super Profile; Boeing 707 — Super Profile; and Harrier — Super Profile series edited by Christopher Chant, published by the Haynes Publishing Group (56pp inc 8pp colour) at £4.95 each

1940 — The Story of No 11 Group Fighter Command by Peter G. Cooksley, published by Robert Hale (224pp plus 16pp illus) at £9.95

Fighter Pilot Tactics — the techniques of daylight air combat by Mike Spick, published by Patrick Stephens (176pp illus text) at £8.95*

USAFE — a primer of Modern Air Combat in Europe by Michael Skinner, photography by George Hall, published by Arms and Armour Press (138pp illus text incl colour) at £4.95*

War winners by Ronald W. Clark, published by Sidgwick and Jackson (154pp illus text) at £6.95

Aerial Warfare: an illustrated history edited by Anthony Robinson, published by Orbis Publishing (384pp illus text) at £12.50*

An illustrated guide to NATO Fighters and Attack aircraft by Bill Gunston, published by Salamander Books (160pp illus text colour throughout) at £3.95*

RAF Towyn 1940-45 and RAF Llanbedr 1941-45 by Wg Cdr David Annand (RAF Retd), published by the author (30pp and 34pp respectively) at £1.50* each inc p&p *Available from David Annand, 25 Erwporthor, Tywyn, Gwynedd

United States Military Aircraft Directory compiled and published by M. G. Jennings and P. M. Giddings (225pp illus text) at £6.95

In uniform — Britain's airworthy warbirds, including replicas and memorial flights by Ken Ellis, published by Merseyside Aviation Society (104pp illus text) at £5.50

British Aircraft Museums Directory compiled by Gordon Riley, published by Aston Publications (32pp illus text) at £0.90

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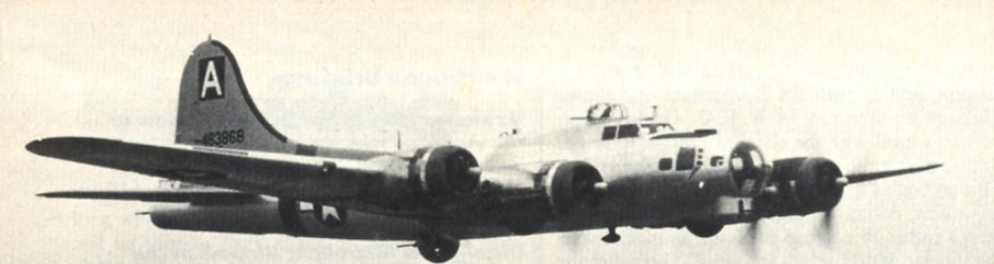
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airview

Peter R. March



Airshow 83

The final weeks of the 1983 air show season saw a number of excellent events planned but a mixed bag of weather rather dampened some of them. The Great Warbird Airshow at West Mallong on 17-18 September got away to a good start on the Saturday, with excellent weather, but a very wet Sunday morning kept many people and participants away. Although the show could rightly claim that it was the biggest gathering of its kind yet held in the UK, it certainly did not live up to the promised scale. Among the 'collections' of aircraft taking part on 17 September were eight Harvards (D-FHGG, G-TSIX, G-SUES, FE992, G-BAFM, G-BGOR, MC280 and FT239), Spitfires P7350, AR213, G-FIRE and NH749, Tiger Moths G-AJHU, G-APMX, G-ASPV, G-AYDI and DF130, Proctors R7524, G-ALJF and G-ANXR, and Dakotas G-AMPO, G-APML and G-DAKS/KG374. Other aircraft appearing included Stephen Gray's Bearcat and Mustang, Provost WW397, Pilatus P2 G-PTWO (now in *Luftwaffe* markings), Graham Warner's Beech 18 G-BKGL (now in US Navy markings as '164'), Stearman G-AZLE, CASA 352 N9012P (recently arrived from Spain), the Howard 500 N500LN (which is now resident at Exeter), Anson WD413 and Mike Beech's SE5A replica G-BDWJ (repainted as F4650). The focus of the show was of course the B-17 *Sally-B*. It is reported that the organisers were out of pocket to the tune of some £15,000 at the end of the event, which must put the future of the Warbird Airshow at West Mallong in some doubt.

The Battle of Britain At Home day at RAF Finningley on 17 September attracted over 100,000 people to the North of England's biggest air show of the year. Once again it was the venue for the annual Kings Cup Air Race, the 61st in the series. And what an exciting race it proved to be with nearly all of the competitors crossing the finishing line within 30sec of one another. The winner was Don Sainsbury flying Cherokee Arrow G-BKFZ closely followed by Ken Wilson in Colt's Harvard FT391/G-AZBN and Ian Dalziel flying the vintage Miles Monarch

568

Left: The RAF Museum's B-17G, 44-83868, arriving at RAF Brize Norton at 17.25hrs on 13 October after a seven hour flight from the Azores. Photo: Peter R. March

Below left: In new colours at West Mallong was Pilatus P2, G-PTWO, which is now masquerading as a *Luftwaffe* fighter. Photo: Roger Wright

aircraft park included RDAF Starfighters R-832 and RT-664, Belgian AF F-16A FA-06 and US Air Force F-16A 80-061 from 50th TFW. RAF newcomers included BAe 146 ZD696 in the static display and VC10 K2 ZA140 which made a fleeting visit from Brize Norton. The resident Phantoms were depleted by the deployment of No 111 Squadron to Akrotiri.

The air display held at Dunkeswell, Devon on 18 September was an ambitious venture by the local flying club which unfortunately failed to attract the public support it deserved. A good programme which included Duxford's Varsity WL645, Vampire T11 WZ507, Gemini G-AKKB, Dakota G-AMPZ, newly restored Tiger Moth G-ANSM, Swordfish LS326, RN Sea King and Wessex, Pace Spirit G-ODOO and even a US Air Force RF-4C Phantom from Alconbury, was watched by little more than 1,000 spectators. The last time that an aircraft the size of a Varsity or a jet aircraft like the Vampire had been seen on this high altitude ex-RAF airfield must have been many years ago.

The last of the year's military air shows took place on 24 September when Air Tattoo '83 was held at RAF Alconbury. This event which had originally been programmed for early August, followed the pattern of the successful Mildenhall air shows, with an extensive static park and a long, varied flying display. Star US Air Force visitors were the 4th TFW F-4E Phantoms 40646 and 41649 from Seymour Johnson AFB, NC which were taking part in the 'Crested Cap' deployment to Ramstein and the 323rd FTW T-43A 11043 from Mather AFB, Ca. A great deal of spectator attention also focused on the resident 17th Reconnaissance Wing Lockheed TR-1A 80-1069. Apart from the US Air Force and RAF, service support came mainly from the West German Navy with Starfighters and an Atlantic 61+20.

Alconbury's flying display relied very heavily upon civilian participation to provide the variety. After the inflation and departure of beer barrel hot-air balloon G-PINT other items included Miles Falcon G-AFLW, Proctor G-AOGE presenting an unusual duo, Lockheed T-33

Below: RNethAF's F-16A, J-252, of No 322 Squadron in its special colour scheme was a participant at Finningley's event on 17 September. Photo: Peter R. March



Top: While Duxford's Varsity WJ945 taxis out at Dunkeswell, Jim Buckingham shows the Gemini G-AKKB to good advantage, on 25 September. Photo: Peter R. March

Above: A rare visitor to the Alconbury Air Tattoo was this Boeing T-43, 11403, from Mather AFB. Photo: Peter R. March

G-TJET, Hunter F51 G-HUNT, Pilatus P-2 G-BJAX, Stearman G-THEA, Anson G-BFIR/WD413 and Gnat G-GNAT among others. The latter aircraft went on to Biggin Hill later in the afternoon to take part in BBC TV's London-Paris record attempt. Luckily the heavy storms which hit Alconbury did not prevent the high speed activities between the two capitals, with Le Bourget being the French destination. The other two jet contenders were Hunter T7 G-BOOM and Falcon 10 OE-GAG, Helicopter support to take the participants from the airport to the capital was provided by Army Lynx AH1 XZ203, Agusta

109 G-HWBK and S76A G-OHTL at the UK end. The winner turned out to be the passenger carried in G-BOOM on its return flight from France.

At long last the Shuttleworth Trust was blessed by near perfect weather conditions for the annual pageant on 25 September. Blue skies and an almost complete absence of wind allowed the organisers to get most of the airworthy exhibits airborne. John Lewis hopped the Deperdussin and more substantial flights were made by the Blackburn Monoplane and Boxkite replica. Other local participants included the Sopwith Pup N5180 just off major overhaul, Tutor K3215 and F2B Fighter D8096, both back in the air after attention, Triplane replica N5430, Parnall Elf G-AAIN, Arrow Active G-ABVE and a host of

Below: Cliff Lovell brings his Waco UKC-S, NC15214, in to land at Shotteswell airstrip over Mike Stow's rare Viima G-BAAY on 2 October. Photo: Peter R. March



Moths. There was also a good complement of aircraft 'flying through', including Mosquito RR299 and the Battle of Britain Memorial Flight. Of interest among the visiting aircraft were Gull 6 G-AERD, Harvard FX301 and Nord 3202 G-BEFH. The hangars contained the usual residents to which has been added the Heath Parasol G-AFZE now well on the way to being flown. The DH60 Moth G-ATBL was painted up for film work with G-AAAH on one side and G-HUJM on the other. A successful end to the Collection's major events for 1983, but overall a disappointing year for the Trust in terms of weather and public attendance. The 1984 programme of events will revert to the pattern of the late-1970s which seem to have had better results.

The first Aero Jumble held by the FAA Museum at Yeovilton attracted over 4,000 people on a very wet Saturday 1 October. A wide range of stalls were laid out with everything from aircraft components, military bric-a-brac and memorabilia to books and magazines going back to the early days of aero-journalism. It provided a feast for the browser and success for the bargain hunter if he really looked hard amongst the 'junk'. Encouraged by this first venture the Museum has decided to get in early next year with another Aero Jumble on 7 April.

Star visitor to the Vintage Aircraft Club's event at the Shotteswell Airstrip near Banbury on 2 October was undoubtedly the Waco UKC-S NC15214. This big radial engine cabin biplane was flown in by Cliff Lovell from his strip near Kingsclere from whence it has been operated since its arrival from the USA in August. Needless to say it attracted considerable interest from the VAC members and spectators who peered in awe at the impressive leather clad interior and gleaming powerplant and interior. Also amongst the two-dozen or so visitors were the Viima G-BAAY painted to look like an FW Stieglitz, Tiger Moth G-ALIW, Piper PA-20 G-PAXX, Cessna 170 G-AWOU and Aeronaas G-BFAF and G-BJEV both in their military guises. Although the blustery wind conditions made flying a bit difficult at Shotteswell, it was considerably worse a week later for the Piper Rag 'n Stick fly-in at Popham. Of the half-a-dozen arrivals only Cub G-BDCD and Super Cub G-BIRH really qualified under the title of the event.

So the 1983 air show season faded out in much the way that it started with generally very mixed weather conditions for the first two months. The excellent July and August gave way to very unsettled weekends in particular during September and October. Let's hope that 1984 gives display organisers a better chance of meeting costs and contributing to the charities they support. Readers might like to note that the dates for one of the year's major events has now been fixed, the International Air Show and Helimeet to be presented by the Army Air Corps at Middle Wallop on 6-7 July. Pre-season events for which provisional dates are now known include:

January 1 — Harrogate, Yorks; 4th Brass Monkey Hot Air Balloon Meet (Tel: 0225 834686). Subject to the weather it starts on the previous day.

January 1 — Compton Abbas, Dorset; New Year's Day Fly-in (Tel: 0747 811767) (or January 2 if weather unsuitable on New Years Day).

January 7-8 — Marsh Benham, Newbury, Berks; 12th Icicle Hot Air Balloon Meet (Tel: 0225 834686).

January 15 — Finmere, Bucks; Vintage Aircraft Club's Snowball Rally (Tel: 02806 207).

February 12 — Finmere, Bucks; Vintage Aircraft Club's Valentine Fly-in (Tel: 02806-207).

April 1 — Finmere, Bucks; Vintage Aircraft Club's Daffodil Rally (Tel: 02806 207).

569



Preservation view

The big news this month concerns the additions to the Imperial War Museum and the RAF Museum, Hendon. Boeing B-52D 56-0689 made a dramatic arrival at Duxford, Cambs on Saturday 8 October. The largest aircraft (span 185ft) to land on the shortened runway required special precautions including the closure of the M11 motorway and ideal weather conditions. The Stratofortress had been prepared by the 7th Bomb Wing, US 8th Air Force at Carswell AFB, Tx for the trans-Atlantic flight, with as much equipment as possible removed to enable it to land at Duxford. It arrived at RAF Brize Norton on the previous Tuesday where the final items were stripped out and the crew took a good look at the Cambridgeshire airfield, using an Abingdon based Bulldog to familiarise themselves with the approach and layout of the airfield. By the end of the week the aircraft and crew were ready for the short ferry flight and with just the weather needed for the exercise the tricky landing was safely accomplished on the Saturday morning, watched by a large body of press and enthusiasts. The official ceremony handing over this strategic nuclear bomber to the Imperial War Museum took place on 20 October. The Museum now boasts three significant aircraft operated by the USAF's 8th Air Force, the B-17 Fortress, B-29 Superfortress and the B-52 Stratofortress.

The Royal Air Force Museum's long awaited B-17 Fortress flew in to Brize Norton late in the afternoon of Thursday, 13 October after a 7,000-mile flight from the USA. Piloted by Air Cdre Ron Dick the B-17G had set out on the trans-Atlantic flight after completing a mini-tour of the USA, calling at the USAF Academy at Colorado Springs, the 2nd Air Force HQ at Barksdale AFB, and the USAF Museum at Dayton, Oh. The Fortress left Andrews AFB Washington, DC on 6 October and routed north to Gander and then across the Atlantic via the Azores. The final seven-hour flight from Lajes to Brize Norton passing uneventfully a week later 'except dodging thunderstorms'. Air Cdre Dick commented on arrival that 'it must be the best B-17 anywhere in the world', the whole flight having been trouble-free and other than refuelling 'it was fit to depart immediately for another long flight — which is more than the crew are'. The pilot had been Air Attache in Washington when the late Derek Eastwood from the RAF Museum visited the USA to seek a B-17 in 1982, and after assisting with the location of the aircraft had kept closely associated with the project to fly it across to the UK.

The beautifully polished metal-finished B-17G, fully equipped with gun turrets, bomb sight and as much genuine instrumentation and fittings as possible, is painted with the colours of the 332nd Bombardment Squadron (red engine cowlings) of the 94th Bombardment Group (letter A on the tail), 3rd Air Division (black square round the A), 8th Air Force, a unit based at Bury St Edmunds from 13 June 1943 until 9 December 1945. Serialled 483868 (44-83868) it was one of the last Fortresses built (constructor's number 32509) by

Douglas Aircraft at Long Beach, Ca in 1945 as a B-17G-95DL and powered by Studebaker manufactured Wright R-1820-97 engines. It does not appear to have been delivered to the USAF but was completed by Douglas as a PB-1W for the US Navy and allocated the BuAer number 77233. In service it carried the markings XD-2 and XD-24 before being retired in the late-1950s. It was purchased by the Aero Union Corporation of Chico, Ca and in 1960 was registered as N5237V before changing hands, going first to Butler Aircraft at Redmond, Or and TBM Inc of Tulare, Ca. It was flown extensively as a fire-fighting water-bomber (numbered 15F and later 65) for 20 years up to 1982, when it was purchased for the RAF Museum.

The B-17's former operator Ken Stubbs took charge of the huge task of converting the stripped out 'air tanker' back to USAF wartime B-17G configuration. He has achieved this with remarkable success as he was proud to show the enthusiastic party that greeted the Fortress's arrival at Brize Norton. Ken Stubbs had seen the project through to its completion, having acted as co-pilot for the delivery flight. The third member of the crew was Flt Lt Dave Fox from No 10 Squadron, who is more used to higher speed trans-Atlantic crossings as navigator on a VC10. Three-thousand special commemorative philatelic covers signed by the crew and bearing American Congressional Medal of Honour stamps were carried on the flight, to be sold in aid of the RAF Museum.

Asked whether the B-17 would be flown in the UK, Air Cdre Dick said he thought it would pay tribute to the many US airmen who flew with the 8th Air Force during the last war by flying over some of the East Anglian bases which had provided the focus of B-17 operations. It would then fly into Abingdon where it will be dismantled for transportation to the Bomber Command Museum at Hendon where it will be rebuilt for display alongside the Lancaster, Mitchell, Mosquito and Wellington from the same period.

Below: Air Cdre Ron Dick flanked by his crew, navigator Flt Lt Dave Fox (left) and Ken Stubbs, co-pilot (right). Photo: Peter R. March



Left: Ex-US Air Force Boeing B-52D, 56-0689, arrived at Brize Norton on 4 October and flew on to Duxford on 8 October to join the IWM collection. Photo: Peter R. March

Another aircraft which might well find its way into the RAF Museum collection, Britannia XX367, was retired from service with the A&AEE at Boscombe Down on 12 October. This 25-years old former airliner (BOAC's G-AOVM) had reached the point at which a major overhaul was necessary and the MoD(PE) decided that funds were not available nor justified for this to be done. It has therefore been allocated for disposal and various offers have been made. As the last remaining airworthy example in the UK of a type which made an important contribution to the RAF's transport fleet and of course BOAC, it should go to RAF Cosford to fill an important gap in the collection of airliners and former RAF transport aircraft.

The Lincoln Field and Vintage Aircraft Collection at Bushey was expanded quite considerably during the summer months. Meteor NF14 WS760 which was included in the Duxford sale after its appearance in the TV series *Aerodrome* has been delivered, also Provost T1 XF914 has been reclaimed from the Loughborough & Leicester collection at East Midlands. The components of Vampire T11s WZ415, XD459, XE860, XE928 and XH328 have arrived from Keevil where they had been stored.

Pennine Aviation Museum

The origins of the Museum go back to 1973 when David Stansfield and Peter Moran, decided to produce and circulate a magazine among people recovering crashed wartime aircraft. The venture slowly took off and the magazine is still published today as the official organ of the British Aviation Archaeological Council. By 1975 a small collection of aeronautical items from crash sites was being amassed in the Bacup area, and an approach was made to the local council to obtain a building for a museum in Rossendale. In the autumn of the same year the museum started life on a very overgrown half acre of land at the rear of Moorlands Park, Bacup in a rather derelict building, apparently the old coach house for the long demolished Moorlands House.

Much work needed to be done on the site. The building was obviously the major priority and it was completely re-roofed, a concrete floor laid and much interior decoration completed. On the site a fence was erected around the land and subsequently it was landscaped into a unique system of terraces by a professional contractor in preparation for the placing of aircraft. Over a period of almost eight years the collection of aviation exhibits has grown. However, the main policy of the museum is to complete the work on the museum building and site before spending vast amounts of money on acquiring aircraft for outside display. The aircraft obtained so far have been donated free, and have usually been taken on charge because they were in danger

Right: Saab AJ-37 Viggen, 37064, from F6 Karlsborg arriving at RAF Coltishall on 19 September for a short visit to the UK. Photo: John Dunnell

Below right: RSwedAF C-130H 84008 from F7 Satenas provided support for the Viggen's visit to Coltishall on 19 September. Photo: John Dunnell

of being scrapped. The overall aim of the museum is to preserve the aviation history of the northwest of England and the items already obtained for display or restoration generally reflect this.

The first aircraft acquired was Vampire T11 XK627 built at Chester. It started its life with the Central Flying School where it served until 1961. In August 1962 it was allocated to No 8 Flying Training School at RAF Shawbury where it served for just over a year before being put into storage by 19MU. In 1968 it was sold to Hawker Siddeley and again put into storage following the collapse of an idea by an American company to convert it and other Vampires into executive jets. In 1973 it was given to Hazel Grove Secondary School in Cheshire. In 1979 it was 're-discovered' by the museum looking worse for wear at the hands of vandals. Arrangements were made and during the next two months the aircraft was dismantled and moved to Bacup.

The second aircraft was Avro Anson T21, VV901. It was constructed at the shadow factory at Leeds during 1948/49 and it was ready for collection on 30 May 1949. Its first unit was No 1 Reserve Flying School where it stayed for nearly four years. Then it went to 23MU for six months followed by five years with 22MU. In 1958 it went to 12MU and in July was delivered to Durham University Air Squadron. Its last operational unit was No 2 Civilian Fighter Control Co-operation Unit where it remained for three years. It was struck off charge on 21 August 1961 and was sold for scrap to the Spastics Society. It was taken to Irton Hall School Cumberland to be used as a plaything. During its stay a number of components were lost including the outer wings some 20ft in length. It was found by the Aeroplane Collection Ltd, in 1977 and moved to Cosford. In 1978 Pennine acquired the aircraft and it eventually arrived at the museum in 1979 following a short stay at RAF Burtonwood. Extensive restoration work is needed to this particular aircraft.

During 1979 the fuselage of a Waco GG-4A Hadrian glider was recovered from a garden in the Ormskirk area. It is believed to be the most complete Hadrian in the country. Once again much restoration is needed, but initially work will concentrate on renovating the cockpit section which it is hoped will be used as a travelling exhibit. The identity BAOC 157 has been allocated to it. There are many smaller exhibits at the museum including several engines: a Gipsy Major, Double Mamba, Cheetah, Pegasus and Mercury. The most recent acquisitions are cockpit sections from Boulton Paul Balliol T2s one being WN534, again rescued from Wigan before they were scrapped.

Membership of the Museum is £4.00 per annum for individuals and includes subscription to 'Five-o-Four' the quarterly house magazine. Social and fund-raising events are held throughout the year, as are visits to museums, factories and air displays. A sales stall is taken to several air displays during the summer also.

For further information on the Pennine Aviation Museum, contact: David Stansfield, School House, Sharneyford, Bacup, Lancashire OL13 9UQ.

Right: Beech Duchess G-BGVH of All Charter over the Isle of Wight in October. Photo: Brian Strickland

DECEMBER 1983



Swedish visitors

The autumn regularly sees a host of NATO aircraft visiting this country, usually in connection with the exercises which take place at this time of the year. Far less frequent are visits by operational air arms from outside of the alliance, apart from France. On 19 September four Royal Swedish Air Force Viggens and a C-130H Hercules (84008) arrived at RAF Coltishall for a short four day visit. The visit was led by the

station commander of Base F6 at Karlsborg, Col Gunnar Hovgard, who was accompanied by 20 personnel. Of particular interest amongst the four Viggens was a two-seat Sk 37 trainer with its distinctive raised second cockpit. During the visit the Swedes gave a presentation on operations from highway strips and an excellent aerobatic display was flown by Lt Col Kjell Ofverberg the OC Flying Wing at Karlsborg. It is hoped that a return visit can be made to Sweden by No 41 Squadron sometime in 1984.



Fashionable fliers

A new name has recently appeared on the ever growing list of air operators in the UK — All Charter Ltd based at Bournemouth-Hurn. The fashion chain of Laura Ashley has been operating aircraft for nearly 10 years as a communications aid for the company chairman and directors as the business rapidly expanded through the UK and into Europe. The mainstay of this operation was King Air G-BBVM although several smaller twins were also flown. It was replaced last year by a bigger and faster Super King Air G-BJBP. The company more recently decided to form an air charter company as a wholly owned subsidiary of Laura Ashley Ltd to provide air taxi operations, professional training on light twin-engined aircraft and instrument rating renewals. All Charter was formed with the Super King Air, Navajo G-BHGA and Duchess G-BGVH. In October the Navajo was replaced by King Air C90 G-BJSY

and plans to replace the Duchess were well advanced. It is planned to operate up to 300 hours a year on air taxi operations in addition to the company's own in-house requirements using twin-turbo props from Hurn. The Director and Chief Pilot Captain Bill Booth is now evaluating a short list of executive pure-jets to extend the fleet in 1984 to the meet the parent company's wider needs for longer range and higher speed operations.

For this month's contributions we would like to thank: R. Bonser, A. J. Brown, D. Conway, J. Dunnell, W. Gandy, P. Gingell, J. Guthrie, I. MacFarlane, J. S. Mines, R. Robinson, R. Rudhall, E. A. Shackleton, D. Stansfield and R. Wright. Also the publications *Air North*, *Air Scotland*, *Aviation Ireland*, *British Aviation Review*, *Flightpath*, *Hawkeye*, *Humberside Air Review*, *Irish Air Letter*, *Prestwick Airport Letter*, *RAF News*, *Scottish Air News*, *Skyward*, *South West Aviation News* and *Stansted Aviation Newsletter*.



The original DC-2 *Uiver* photographed above Rotterdam prior to the start of the 1934 race. Photo via the author

Commemorating DC-2 *Uiver*

Report by Joop Wenstedt/Phoenix Avia Press

Just under 50 years ago, KLM became the lead European customer for the then revolutionary Douglas DC-2 airliner, when it received its first example in September 1934. The aircraft was registered PH-AJU and named *Uiver* (Stork), but tragically its service life was short as just three months later it crashed during a storm over the Syrian desert. However, *Uiver* had already guaranteed its place in aviation history by gaining second prize in the 1934 MacRobertson Air Race between London and Melbourne.

Now, to commemorate the event, the last airworthy Douglas DC-2 has arrived at Schiphol Airport, Netherlands in preparation for a re-enactment of the famous race. If all goes according to plan the DC-2, appropriately painted-up in the colours of *Uiver*, will depart the UK this month and will arrive at Melbourne in early February 1984.

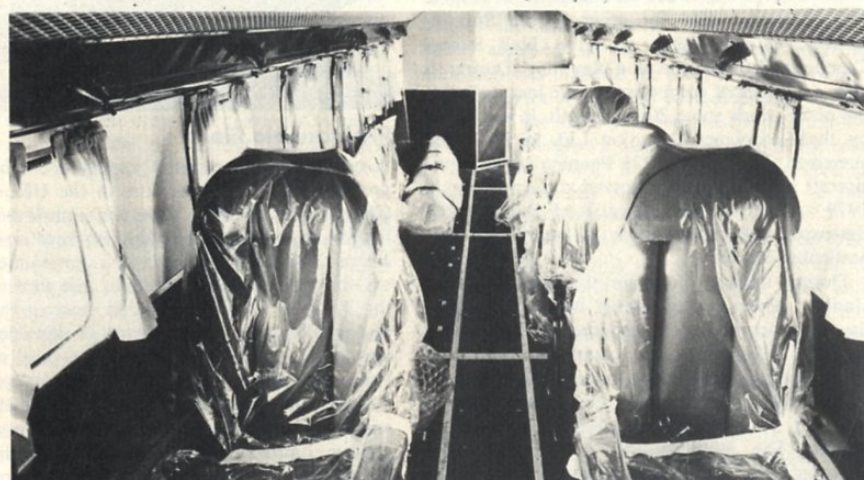
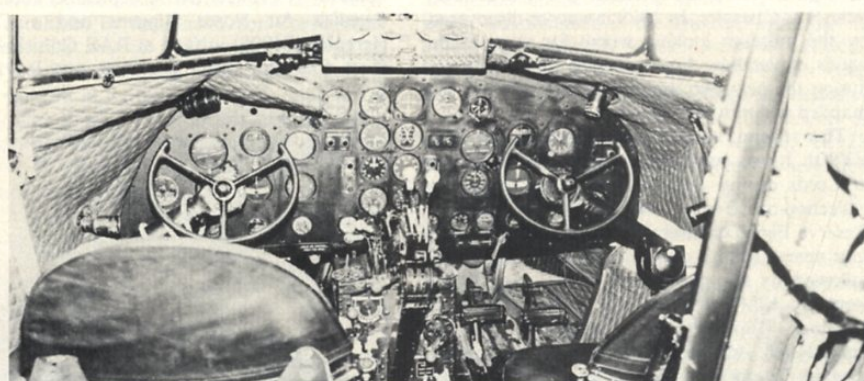
For the 1934 MacRoberts Air Race, the DC-2 participated in the handicap class but was in fact making a normal service flight as it carried passengers and post for the Dutch Indies. However, during the race *Uiver* made good progress and was more than a match for many of its contenders which were special racing aircraft. After several mishaps, including a forced landing at the Australian town of Albury, *Uiver* arrived at Melbourne to become second in the speed category and first in the handicap class. The good performance of the DC-2 in the race was of much importance to Douglas as orders for the aircraft came flooding in.

Today the 'new' *Uiver* is being brought up, as much as possible, to original 1934 standard; this includes the removal of many modern instruments and replacement with old ones. The crew for the commemorative flight will be Jan Plesman (Capt), Fred Schouten (co-pilot) and engineers Bonne Pijpstra and Ton Degenars, who will be accompanied by a television crew of five and two journalists.

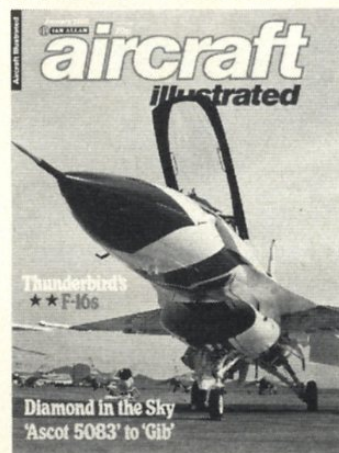
Right, top and bottom: Two views of the 'new' *Uiver* taken in the US before its shipment to the Netherlands. The aircraft is finished in KLM — Royal Dutch Air Lines colours and carries the registration PH-AJU. Photos via the author

Below: The cockpit and interior of the 'new' *Uiver* (ex-NC39165, c/n 1404), showing the remarkable condition in which the aircraft has been kept and restored. Photo: Roger Soupart

Bottom: After its arrival at Antwerp by ship from the US, the DC-2 was transported by barge along the canals to Schiphol. This particular aircraft was built in 1935 as a DC-2-112, c/n 1404. It went in to US Navy service as R2D-1 with BuAer No 9993 and operated from NAS Anacostia and Pensacola. In August 1946 it was bought by D. Mercer and registered as NC39165. It passed through a number of ownership changes until in early-1983 it was modified to '*Uiver*' standard. This included changing the tail and the incorporation of a new nose profile with headlights. Photo: Roger Soupart



Index to Volume 16



JANUARY	pages	1-48
FEBRUARY	pages	49-96
MARCH	pages	97-144
APRIL	pages	145-192
MAY	pages	193-240
JUNE	pages	241-288
JULY	pages	289-336
AUGUST	pages	337-384
SEPTEMBER	pages	385-432
OCTOBER	pages	433-480
NOVEMBER	pages	481-528
DECEMBER	pages	529-576

Note: Main feature articles in bold type.

A310 arrival	323
ACA given go-ahead	342
ACM 'Deci'-style	454
AV-8Bs for Spain	249
A night out with Olivia	111
Aérospatiale, The rotary craft of	366
Airshow 83 preview & programme	232
Airview 'special'	
International Air Tattoo	472
Irish Air Corps jubilee	88
Wattisham in winter	136
ALARM for the RAF	439
Amazon Cat	407
Apache roll-out	534
Army Aviation in Australia	310
Ascension Island (part 2)	86
'Ascot 5083' to Gibraltar	13
Atlantis orders Jetstream	294
Aviation Photography (article series)	
5. Days out and restrictions	26
6. A new season . . . and nostalgia	208
BA leases 737s	486
BAe 146: Britain's new feederliner —	
part 1	272
part 2	300
BAe 146 enters US service	390
BAe's globetrotting 146	108
BAF branches out	154
Beech 1900 details	55
Behind enemy lines	540
Binbrook Lightnings	119
'Blackbirds' at Mildenhall	252
Black Hawks for Switzerland	246
'Black Knights' inaugurate the Hornet	210
Boeing offers 'stretched' 767	152
'Boelcke' Squadrons' farewell to the	
Starfighter	380
Bomber Command Museum	306
Brasilia maiden flight	439
Brazilian AF team to reform on Tucano	198
Buccaneer farewell	502
Buccaneering with 237 OCU	156
Chinooks and the JHSU	506
Christie's sale	279
Commuting in Brazil	402
Constellation Classics	166
Cranfield postscript	452
Croydon Airport project, The	66
Curiouser and QSRA	428
Dauphins for Ireland	150
Devon & Cornwall's flying squad	492
Diamond I in the sky	34
Edwards AFB story, The	30
Egyptian AF: an air force in transition	70
Enforcer flies	249
Excalibur at Calshot	132
Farewell to the 'Weasel Thud' — part 1	172
part 2	206
Festive Phantom	456
First VC10 for RAF	438
First 146 delivered	343
First 757s for BA	150
Flying beef from Beni	410
Flying Hunter One's G-HUNT	214
Flying the Fighting Falcon	253
Fokker Four aerobatic team, The	226
'Fork-Tailed Devil': the P-38 Lightning	396
French maiden flights	55
G-91Ts at Amendola	500
Gatwick's Satellite opens	294
Gatwick's second terminal	6
Glimpses of Guernsey	178
Go fly the Canyon	124
Guernsey's own Airline	512
Helicopter revolution in the Soviet Army, The	128
Hornet enters service	103
Hughes news	199
Hunters in the Middle East	62
International Air Tattoo preview	376
International Air Tattoo report — airview	
'special'	472
Into the Super 80s with the DC-9	60
Irish Air Corps jubilee — airview 'special'	88
'It's not a Corsair anymore'	78
Last Combat	370
Last Xavante delivered	247
Lynch's fire bombing Invaders	221
Maiden flight of A300-600	390
'Mallet Blow': an exercise in offence and	
defence	514
Manchester Air & Space Museum	320
Marlboro Aerobatic Team photo-sortie	358
Military Aircraft Markings 1983 — service	284
aircraft losses in 1982	262
Martinair Holland — part 1	464
part 2	464
McDonnell Douglas re-designates	438
MD-100: a new airliner, a new designation	54
Mirage III NG flies	102
Mirage 2000N flies	198
Monarch flight to Palermo	317
More A-7Ps for Portugal	294
More room at the top: the new 747-300	28
Navy Lynx announced	486
New Falklands airfield go-ahead	438
New Pipers for 1983	57
Nine's Tornados in action	36
No 1 Flying Training School, RAF	349
Northrop's Tigershark: a logical	
development	412
Nurtanio/Bell 412 contract	54
Optica order	152
Oxford Air Training School	160
Paris in retrospect	418
People Express, The non-stop	458
'Planes of Fame' on show	460
RAE Tornado	391
RAF's Husky, The	67
RAF Kemble: Maintaining Excellence	447
RAF Museum's DH9A rebuild complete	258
RAF orders replacement Chinooks	6
RAF SAR in 1982	151
RAF to get JP233	102
Record sales for Shorts	391
RNZAF: the flying Kiwis	550
Service news from Australia	295
SF340 rolled-out	8
SF340 flies	152
Sherpa makes maiden flight	103
Shorts 360 enters service	7
Shuttle Fever	378
Singapore Airlines re-equip	342
Southern Cross to Southampton	201
Spain orders F-18	342
Spruce Goose on display	498
Strutting to St Omer	444
Super 83 launched	151
Swissairbus update	546
TABA selects 146	246
Tabloid for Hendon, A	558
Tanking 25	362
Thunderbirds F-16s	20
Tigereye flies	104
Tilt-rotor update	391
Tornado Operations Evaluation Unit formed	487
Tornado views	248
'Treble-Ones' looping record	468
TriStar enters RAF service	390
Tugs Galore	18
UK military aircraft accident reports	8
Buccaneer S2B, XW537	537
Buccaneer, XX898	345
Bulldog T1, XX662	441
Canberra B2, WK116	296
Chipmunk T10, WP979	296
Gazelle HT3, XX396	199
Harrier GR3, XV807	442
Harrier T4, XW272	153
Harrier GR3, XW923	199
Harrier GR3, XZ139	440
Harrier GR3, XZ973	345
Hunter FGA9, XE649	441
Hunter FGA9, XG151	344
Hunter T7, XL583	489
Hunter T7, XL593	106
Hunter T7, XL597	107
Hunter T7, XL619	297
Jaguar GR1, XX113	297
Jaguar GR1, XX122	199
Jaguar GR1, XX758	489
Jaguar GR1, XX760	488
Jaguar GR1, XX820	393
Jaguar T2, XX828	440
Jaguar GR1, XX957	107
Jaguar GR1, XX972	8
Jet Provost T3A, XM366	153
Jet Provost T3A, XN643	488
Jet Provost T4, XP564	442
Jet Provost T5A, XW288	107
Lightning F6, XR765	106
Phantom FG1, XT866	441
Phantom FGR2, XT912	56
Whirlwind HAR10, XP347	

Variations on a theme: the BAe 125	394
srs 800	
VMGR-352 'on the job, on time, all the	114
time'	
Voodoos to Phantoms	22
Vulcan bomber retires	103

Wallis Autogyro comes of age	82
Warbirds at Biggin	365
'Warhogs' at Kemble	519
Water-bombing the French Riviera	509
Wattisham in winter — airview 'special'	136
Westland Wessex	268
Where have all the Vulcans gone?	184

Zurich scenes	562
----------------------	------------



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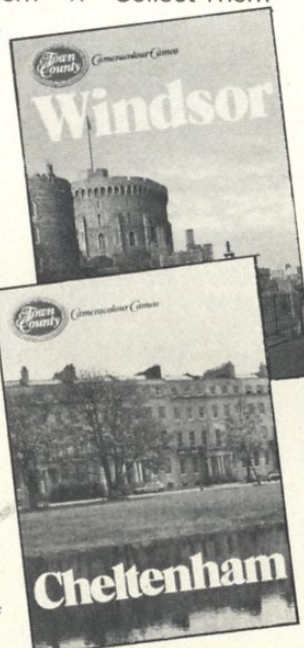
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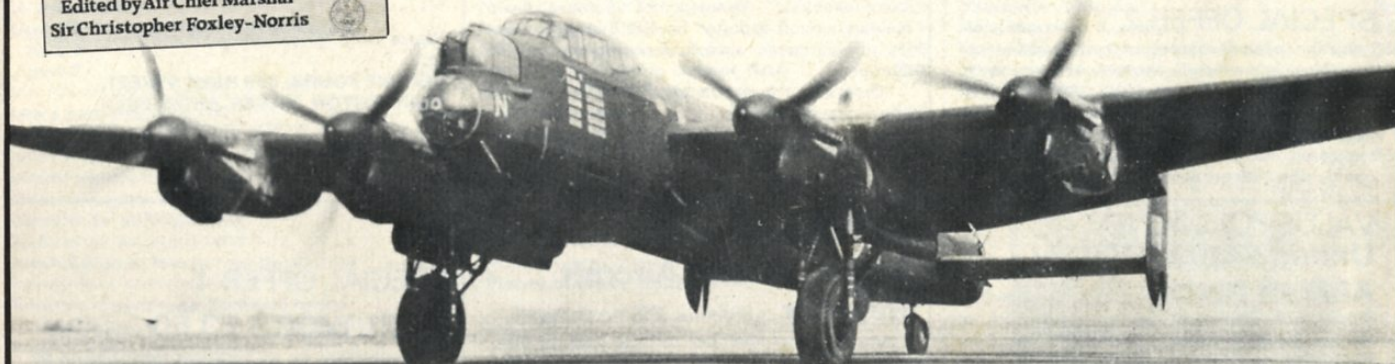


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